Alcoa Wheel Service Manual

Europe, January 2010

ALCOA
WHEELS

Alcoa Wheel Service Manual - Europe

January 2010

Supersedes all previous manuals (Technical Data, Valve Application Chart, Balancing Manual, ALgrease brochure, Rim Flange Wear Instructions)

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1 Manual

Please read the following instructions carefully. This manual should be retained for later use. This manual gives detailed information and is available on line at www.alcoa.com/alcoawheels/europe/en/info_page/technical.asp

Free hard copies are available from Alcoa Wheel Products Europe and authorized Alcoa Wheel distributors upon simple request. Contact Alcoa Wheel Products Europe at +32 11 45 84 60.

2 Limited warranty

For medium & heavy duty truck, trailer and bus wheels

Alcoa warrants to the original purchaser, from Alcoa or its authorized distributor, that a new Alcoa aluminium medium & heavy duty truck, trailer and bus wheel is free from defects in material and workmanship.

Alcoa agrees, without charge, to repair or replace a wheel that fails in normal use and service because of defects in material and workmanship. Truck, trailer, bus wheels and the Dura-Bright® surface treatment are warranted for 60 months from the date of manufacture as shown on the wheel, except the Dura-Flange® rim flange treatment which is warranted for a period of 24 months against wear which creates a sharp edge that would require maintenance.

Alcoa does not warrant and will not repair or replace or make adjustment with respect to any wheel that has been subjected to misuse or abuse including the following:

(a) using a tyre that is oversized according to standards recommended by the Tire and Rim Association, Inc. or other recognized tyre and rim agencies such as ETRTO (Europe) or others;
(b) loading the wheel beyond the applicable maximum wheel load as specified by Alcoa;
(c) inflating beyond the applicable maximum as specified on the Alcoa wheels;
(d) changing the original condition of the wheel by alteration or by subjecting it to any processing such as welding or straightening;
(e) accidents, abnormal or severe operating conditions including without limitation tyre fires, brake fires, severe brake system drags or seizures or running with a flat tyre;
(f) failure to follow maintenance and other instructions and warnings set forth in the alcoa wheel service manual, alcoa technical bulletins and other alcoa literature. recommended maintenance includes, without limitation, using proper torque, periodic cleaning, polishing, valve replacement, periodic inspection for damage, loose lug nuts and rim flange wear inspections and procedures;
(g) nicks, scratches and other surface blemishes resulting from improper maintenance, cleaning, road debris, curbing, accident or operation are not warrantable.
(h) rim flange wear (other than dura-flange®) is not warrantable;
(i) damage due to cleaning with abrasives, abrasive brushes, steel wool, scouring pads, or strong chemicals (acids or alkaline).

Dura-Bright® surface treated wheels are warranted against:

- filiform corrosion (worm or hair like lines, generally milky in appearance, underneath surface protective treatment and emanating from damage to the surface treatment such as nicks, scratches or damage from mounting hardware or wheel weights);
- blistering or peeling due to loss of adhesion of the surface treatment;
- lift off of the surface treatment due to physical damage (nicks, scratches, gouges).

If nicks, dings, scratches or other damage does occur to the Dura-Bright® treatment that exposes the aluminium underneath, the metal exposed may naturally oxidize, but any corrosion will be confined to the metal exposed and will not extend into or underneath the Dura-Bright® treatment.

Normally, any washing materials or chemicals (including mild acid washes) that can safely be used on a vehicle, its painted surfaces and components, can safely be used on the Dura-Bright® surface treatment. The Dura-Bright® treatment prevents corrosion of aluminium wheels and protects their shine. So long as the treatment remains in place (see comments (g) and (h) on page 4) and is maintained in accordance with section 7.b of this manual, it is warranted against corrosion.

If corrosion does occur within the treatment warranty period, subject to the limitations stated above, Alcoa will replace any wheel exhibiting such corrosion.

There is no warranty that the wheel shall be merchantable or fit for any particular purpose, nor is there any other warranty, express or implied, except such as is expressly set forth herein. Alcoa shall not be liable for any incidental or consequential damages for any breach of warranty, its liability and the purchaser's exclusive remedy being limited to repair or replacement of the wheel as stated in this limited warranty.

This limited warranty should be used in conjunction with this Alcoa Wheel Service Manual. This manual contains important safety information and warnings, and failure to read and understand this information may result in serious injury or death.

The limited warranty is included with the Alcoa Wheel Service Manual, but may appear elsewhere. If you do not have copies of the Alcoa Wheel Service Manual you may obtain copies free of charge from Alcoa Wheel Products Europe, Paal, Belgium, tel. +32 11 45 84 60 or on www.alcoa.com/alcoawheels/europe/en/info_page/technical.asp

Warning

Wheels that are not properly installed or maintained may not be safe.

Failure to follow proper wheel installation or maintenance practices may result in injury or death.

Follow the proper wheel installation and maintenance practices as contained in this Alcoa Wheel Service Manual.

3 Safety

Safety is everybody's business. Do not attempt to service any wheel assembly without proper training.

Proper equipment is important. Be sure you have the recommended tools and equipment on hand and use them according to manufacturer's instructions.

Tubeless wheels and tyres require the same care. Even though tubeless assemblies have fewer parts than multi-piece wheels, they still require respect and proper handling.

Pay particular attention during crucial steps:
- removal of tyre and wheel assemblies from vehicles
- demounting tyre from wheel
- wheel inspections
- mounting of tyre to wheel
- inflation of tyre
- handling and storing of inflated assembly
- mounting of the assembly to the vehicle

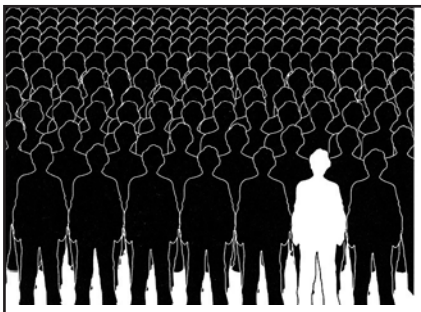
Safety and service information is readily available. Wheel, tyre and service equipment manufacturers offer service manuals and other training materials. Stay up to date on proper procedures and keep current instructional materials handy in the shop. Study safety and service information and use it on the job.

Warning

An inflated wheel and tyre assembly contains enough air pressure to cause an explosive separation.

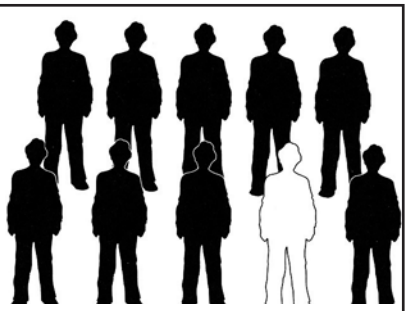
Unsafe handling or failure to follow approved mounting and demounting procedures can lead to serious injury or death.

Study, understand and follow the procedures contained in this manual.



1 in 1000
TYPICAL INDUSTRY

Statistics show that in most industries, at worst only one in 1000 serious accidents results in a fatality. But when the accident involves tyres and wheels, statistically one in every 10 serious accidents is a fatality. That's 100 times more often than in most other industries.



1 in 10
THE SERVICE INDUSTRY

4 Wheel Selection

4.a. Alcoa Wheel Specification Sheet

Wheel specifications listed in the Specification Sheet are subject to change without prior notice. To request a free copy of the current Alcoa Wheel 'Specification Sheet' call Alcoa Wheel Products Europe or an authorized Alcoa Wheel distributor. Contact Alcoa Wheel Products Europe at +32 11 45 84 60.

To view online go to
www.alcoa.com/alcoawheels/europe/en/info_page/wheel_specs_technical.asp

The Alcoa Wheel Specification Sheet contains the current part number availability and complete specifications such as wheel dimensions, offsets and load ratings.

Note: Dura-Bright® wheels produced after November 2002 have Alcoa wheel part numbers ending with "DB". Earlier wheels have part numbers ending in a 4 or 7. Most Alcoa wheels are available with the Dura-Bright® surface treatment.

Note: Currently Dura-Bright® and Dura-Flange® options are not available together on the same wheel. Dura-Bright® is available on most polished wheels; Dura-Flange® is available on brushed finish only.

4.b. Disc brake equipped axles

Most Alcoa wheels come with a protected valve design that reduce the risk that during rotation foreign parts like stones entered in the inner wheel area can be taken up by the valve. Objects striking the fixed brake calliper of a disc brake system can lead to damages on the valve or brake calliper.

All current produced 22.5" and 19.5" Alcoa wheels for European vehicles have a protected valve design that can be mounted on axles with disc brakes. Some 17.5" Alcoa wheels do not have a protected valve design and can be fitted on axles with drum brakes only. See Alcoa Wheel Specification Sheet.

4.c. General characteristics

Wheel material	: forged aluminium alloy 6061, T6 tempered
Approved by	: LBF, TÜV, JWL-T and all European vehicle manufacturers
ISO certificates	: ISO 14001: 2004 EMS (Environmental Management System) ISO/TS 16949: 2002
Tyre sizes	: All ETRTO approved sizes
Max. infl. press.	: 900 kPa, 130 PSI (cold)
Nuts	: Two piece nut or two piece sleeved nut according to DIN 74361 standards
Mounting	: Hub centered according to DIN 74361 standards
Valve torque	: 12 to 15 Nm (9 to 11 Ft-Lb)
Wheel nut torque	: Recommended by truck or axle manufacturer
Availability wheels	: Through all vehicle manufacturers or authorized Alcoa distributors.

4.d. Alcoa wheel identification

Since 1977, all Alcoa aluminium disc wheels have been identified with a stamp that shows the wheel load rating, maximum inflation pressure, date of manufacture, part number, wheel description and DOT marking designation.

Prior to June 1996, all Alcoa heavy duty truck wheels had the Alcoa identification Symbol ⋈ on the outside of the disc near the hand hole in line with the valve location. This marking was phased out on heavy duty truck wheels manufactured after June 1996.

All Dura-Bright® surface treated wheels are designated by the letters "DB" following the part number such as 896513DB.

All Dura-Flange® wheels are designated by the letters "DF" following the part number such as 896510DF.

If you cannot identify the size or load rating of the wheel it should not be used.

Wheels made between 1996 and 2009

- ALCOA® FORGED
- MAX LOAD 3550 Kg (wheel load rating)
- MAX KPa 952 T-DOT (maximum inflation pressure)
- T-DOT (FMVSS 120 designation)
- JWL-T (symbol Japanese impact test)
- MADE IN HUNGARY (can also be: JAPAN / MEXICO / U.S.A.)
- 021703 (date of manufacture month/day/year, in this case February 17, 2003) (prior to 2000, wheels may have month/year only)
- PART NO 874503 (part number)
- 22.5 X 7.50 15° DC (wheel size for tubeless heavy duty tyres)
- 1 (2 or 3) (packing line)

Wheels made as from 2009

- ALCOA® FORGED
- MAX LOAD 4500 kg (9920 LB) (wheel load rating)
- MAX PRESS. 900 kPa (130 PSI) (maximum inflation pressure)
- HUNGARY (made in…) (can also be: JAPAN / MEXICO / U.S.A.)
- 112309 (date of manufacture month/day/year, in this case November 23, 2009)
- PART NO 812522DB (part number)
- 22.5 X 11.75 - 0 (wheel size and offset)
- T-DOT (FMVSS 120 designation)
- JWL-T (symbol Japanese impact test)

4.e. Table: matching tyre to rim

Before mounting a tyre to a wheel check if tyre and wheel size match.

Rim width to tyre matching chart (most common sizes) for medium and heavy trucks according to ETRTO			
Tyre size / section code	**Approved rim contours**		
Normal Section Sizes			
7	5.25		
8 and 8.5	5.25	6.00	6.75
9 and 9.5	6.00	6.75	
10	6.75	7.50	
11	7.50	8.25	
12	8.25	9.00	
13	9.00	9.75	
'60' Series			
285/60	8.25	9.00	
295/60	9.00	9.75	
305/60	9.00	9.75	
315/60	9.00	9.75	
'65' Series			
385/65	11.75	12.25	
425/65	13.00	14.00	
445/65	14.00		
'70', '75', '80' and '90' Series			
205	5.25	6.00	6.75
215	6.00	6.75	
225	6.00	6.75	
235	6.75	7.50	
245	6.75	7.50	
255	6.75	7.50	8.25
265	6.75	7.50	8.25
275	7.50	8.25	
285	7.50	8.25	9.00
295	8.25	9.00	
305	8.25	9.00	
315	9.00	9.75	

There may be additional rim to tyre matches not shown here. Contact the manufacturer or the Alcoa wheel sales manager for additional information (see contact page on www.alcoa.com/alcoawheels/europe/en/info_page/contact_us.asp)

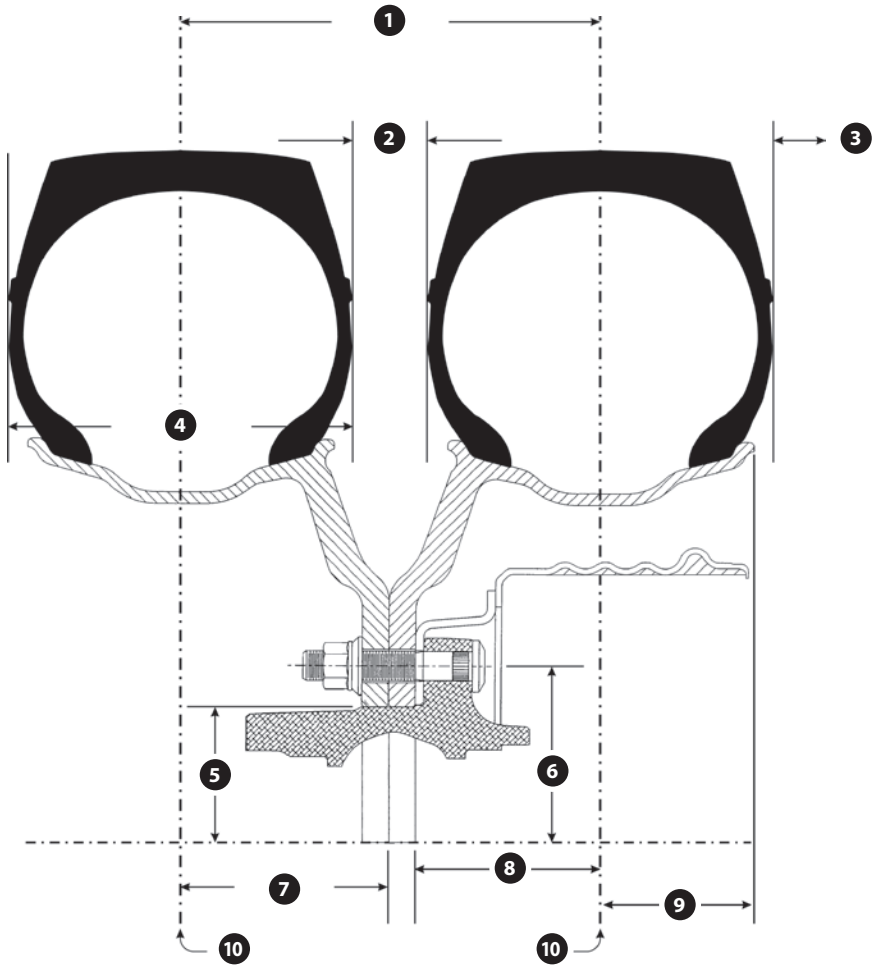
Specific tyre manufacturers may have other recommendations.

4.f. Wheel measurement

How to measure minimum dual spacing

Minimum dual spacing measurement is determined by the tyre manufacturer and may be obtained from the tyre manufacturer's handbook. To determine if the Alcoa aluminium dual wheel assembly has adequate minimum dual spacing for the selected tyres, double the wheel outset measurement of the Alcoa wheel used. If the doubled outset measurement is equal to or greater than the tyre manufacturer's recommendation, there will be sufficient minimum dual spacing. Wheel inset and outset is given for each Alcoa wheel on the Wheel Specification Sheet. Both inset and outset wheels are measured from the mounting surface of the wheel to the center line of the rim. Maintaining proper tyre inflation and load ratings are essential to maintaining proper minimum dual spacing.

1. dual spacing
2. tyre clearance
3. vehicle clearance
4. tyre section width
5. center hole diameter
6. bolt circle diameter
7. wheel outset
8. wheel inset
9. back space
10. tyre center line



4.g. Mixed application of Alcoa and steel wheels

Alcoa aluminium truck wheels can be operated dualled with a steel inner wheel. In the event a steel inner wheel is used, extreme care must be exercised to properly fix both wheels to the hub.

The selection of correct hardware i.e. nuts, sleeved cap nuts & studs are crucial to obtain a safe fixation as well as enough pilot tab length on the hub to properly center the outer aluminium wheel.

Wheels

Both wheels, steel and Alcoa, must match: wheel size and offset, wheel load index as well as being fitted with matching tyres and tread of the same depth.

A mixed dual fitment is subject to all recommendations and guide lines that apply for safe and proper fitment of a steel dual and aluminium dual fitment referring to manuals of steel wheel OEM and the Alcoa Wheel Service Manual.

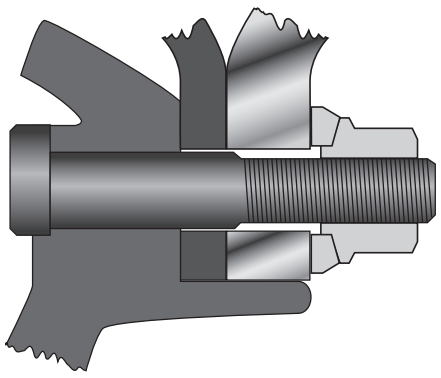
Note: When mounting painted steel inner dual wheels with outer Alcoa wheels, be cautious of excessive paint build-up on the inner steel wheel. Excessive paint can reduce the clamping force and allow the wheels to become loose.

HUB ENGAGEMENT

1. Stud standout and thread engagement (hardware)

For use with 2 piece flange nuts and replacing studs the minimal stud standout must be:

- 1x disc thickness steel wheel + 1x disc thickness Alcoa wheel + height of nut + 3 mm for use with M22, M20 or M 18 x 1.5 threads (or 2 full threads in case of other type of threading such as BSF or UNF)
- Example: the disc thickness of 1x steel wheel and 1x Alcoa wheel added with a regular 2 piece flange nut M22 x 1.5 result in a stud standout of 12 + 22 + 27 + 3 = 64 mm



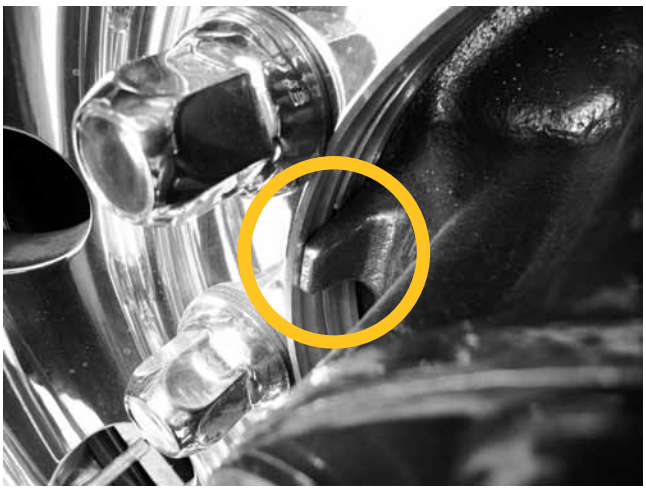
For use with 2 piece sleeved cap nuts the minimal number of thread engagement between stud & nut must be:

- 14 full turns for M22 x 1.5 (Metric, Volvo from 2005)
- 13 full turns for M20 x 1.5 (Metric)
- 12 full turns for M18 x 1.5 (Metric)
- 10 full turns for 7/8"-11 BSF (Scania)
- 12 full turns for 7/8"-14 UNF (Volvo up to 2004)

2. Piloting

Hubs designed for steel hub piloted wheels may not have enough pilot length to locate Alcoa dualled aluminium wheels or with an Alcoa at the outer position and a steel wheel at the inner position.

Pay close attention to the pilot tab length, particularly when converting from steel to aluminium duals. Measure the hub pilot to make sure the hub has a minimum pilot length that allows no less than 5 mm for the outer wheel, excluding the bevelled edges. The horizontal part of the pilot therefore should be at least 27 mm in case the inner aluminium wheel's disc thickness is 22 mm. The horizontal part of the pilot must be at least 17 mm for a mixed dual in case the inner steel wheel's disc thickness is 12 mm.



3. Torque

When dualing steel wheels with Alcoa aluminium wheels, follow the vehicle manufacturer's recommendations regarding the proper torque and use of thread lubricants to mount the wheel.

Caution

Due to different mechanical properties of steel wheels and forged aluminium wheels a mixed dual may decrease the lifetime of one or the other. It is therefore recommended not to use mixed fitments in vocational, heavy load hauling fleets and / or off road applications.

4.h. Owner / in-service identification

Some fleets wish to specially identify wheels as to OWNERSHIP and IN-SERVICE dates. Alcoa recommends that fleets and owner-operators adopt the practice of permanently stamping wheels with the date they are first placed into service.

1. Use "Lo-Stress" stamps or equivalent.
2. Location of stamped areas on outside disc should be in space outward from a line between hand hole centers and a minimum of 2,5 cm or 1.0" inch from the periphery of any hand hole.
3. Location of stamped identification on inside of wheel should be as close to the factory identification stamping as possible.

Note: Use of an impression stamp on Dura-Bright® surface treated wheels can affect the appearance and performance of the Dura-Bright® surface treatment local to the stamp.

5 Putting wheels in service

Warning

- Do not exceed maximum wheel load. Customer must compare OEM vehicle and OEM tyre load rating to maximum wheel load rating.
- Some wheels are not designed for use on axles with disc brake systems. For reference see wheel part numbers on Alcoa Wheel Specification Sheet.
- Refer to tyre manufacturer's recommendation for proper tyre pressure.
- Before mounting the tyre, perform a wheel fitment check to ensure proper clearance from any obstructions.

5.a. Putting wheels in service / hidden damage

Do not exceed maximum wheel load. Customer must compare OEM vehicle load rating to maximum wheel load rating.

Do not overinflate. Use the tyre manufacturer's recommended pressure, but under no circumstances exceed cold inflation pressure listed in General Characteristics (see Section 4.c.) of this manual. Before mounting the tyre perform a wheel fitment check to insure proper clearance from any obstructions.

Some forms of wheel damage can be hidden beneath the tyre, so whenever a tyre is removed, thoroughly examine the complete wheel. Remove all grease and road dirt. Use a wire brush or steel wool to remove rubber from the bead seats.

Check mounting holes for the enlargement and elongation which can occur if the cap nuts are not kept tight (see Section 5.n.iii.). Dirt streaks radiating from stud holes may indicate loose cap nuts.

5.b. Putting wheels in service / wheel alteration

Alcoa does not approve any form of alteration to wheels except minor cosmetic buffing for appearance purposes or light sanding for burrs in the rim flange area (see Section 6.f.iii.).

Wheels should not be altered by welding, brazing or other heat application in an attempt to repair or straighten a wheel. Use of adapter plates or bead-locks are not approved on Alcoa wheels.

Wheels should not be painted or otherwise coated in any way that may interfere with the mounting surfaces.

Any wheels that shows signs of alteration should be removed from service and scrapped.

Warning

Welding, brazing or otherwise heating any area of an Alcoa aluminium wheel will weaken the wheel. Weakened or damaged wheels can lead to an explosive separation of tyres and wheels or wheel failure on the vehicle.

Explosive separations of tyres and wheels or wheel failure on the vehicle could cause serious injuries or death.

Never attempt to weld, braze or heat any surface of an Alcoa aluminium wheel.

5.c. Mounting area / support surface diameters

The support surface of the hub should be flat to the diameter recommended (per SAE J694) below to properly accommodate the wheel disc area.

Applicable to hub pilot mounting type Alcoa wheels:

Bolt circle	Nr of bolts	Thread size	Backup Ø mm	Backup Ø inch
335	10	M22 x 1.5	381 – 386	15.0 – 15.2
335	10	7/8″ - 11 BSF	381 – 386	15.0 – 15.2
335	10	7/8″ - 14 UNF	381 – 386	15.0 – 15.2
275	8	M22 x 1.5	335 – 343	13.2 – 13.5
275	8	M20 x 1.5	315 – 320	12.4 – 12.6
245	6	M18 x 1.5	284 – 290	11.2 – 11.4
225	10	M22 x 1.5	274 – 279	10.8 – 11.0
205	6	M18 x 1.5	246 – 249	9.7 – 9.8

5.d. Before tyre mounting

- Do not exceed maximum wheel load. Customer must compare OEM vehicle load rating to maximum wheel load rating.
- Refer to tyre manufacturer's recommendation for proper tyre pressure.
- Before mounting the tyre perform a wheel fitment check to insure proper clearance from any obstructions.
- Do not use a wheel that has been subjected to high pressure tyre & rim separation, run flat, excessive heat, or other physical damage. A wheel subjected to any of these conditions may no longer have sufficient dimension and contour to retain the tyre bead while under pressure.
- A cracked or damaged wheel may cause the wheel to fail or come off the vehicle while the vehicle is moving.
- Do not straighten the wheels. Do not heat the wheels in an attempt to soften them for straightening or to repair other damage. The special alloy used in these wheels is heat-treated, and uncontrolled heating will weaken the wheel.
- Do not weld the wheels for any reason.

Warning

When tyres are removed, the entire wheel must be cleaned and inspected. With a brush, remove any foreign products from the wheel's bead seats (portions of the wheel that support the tyre).

Check the wheel's flanges for wear with Alcoa's Rim Flange Wear Gauge. Remove sharp edges as explained in Section 6.f.

It is recommended to generously coat the entire air chamber surface with an approved surface protector and lubricate each time the tyre is removed. See the recommendations in section 5.g.

Supersedes Alcoa Valve Application Chart / Manual 2005

- The following information applies to the most common wheels used in Europe.
- Originally wheels may have come with valves that have been replaced and improved meanwhile.
  Therefore the table below lists replacement valves only.
- Includes Dura-Bright® wheels: part numbers with extension DB.
- Includes Dura-Flange® wheels: part numbers with extension DF.

From left to right:
GAX40MS00N
GAX54MS00N
GAX70MS07N2
GAX83MS00N

Diam.	Width	WHEEL PART NR	VALVE PART NR	
17.5″	x 6.00″	66320X	GAX70MS60N	
		66340X	GAX70MS45N	
	x 6.75″	66082X	GAX70MS45N	
		66347X	GAX70MS45N	
		66382X	GAX70MS45N	
19.5″	x 6.75″	76347X	GAX70MS45N	
		76348X	GAX70MS45N	
		76448X	GAX70MS45N	
		76449X	GAX70MS45N	
	x 7.50″	77340X	GAX70MS45N	
		77345X	GAX70MS27N	> 12.2007
			GAX54MS00N	01.2008 >
		77346X	GAX70MS27N	> 12.2007
			GAX54MS00N	01.2008 >
		77347X	GAX70MS27N	> 12.2007
			GAX54MS00N	01.2008 >
	x 8.25″	78340X	GAX70MS45N	
		78342X	GAX70MS45N	
		78345X	GAX70MS27N	> 12.2007
			GAX54MS00N	01.2008 >
		78346X	GAX70MS27N	> 12.2007
			GAX54MS00N	01.2008 >
		78347X	GAX70MS27N	> 12.2007
			GAX54MS00N	01.2008 >
	x 14.00″	7434XX	GAX40MS00N	
22.5″	x 7.50″	87352X	GAX70MS60N	
		87357X	GAX70MS60N	For Volvo including extension GAX09070
		87450X	GAX70MS27N	
		87451X	GAX70MS07N2	
		87452X	GAX70MS07N2	
		87453X	GAX70MS07N2	
		87455X	GAX70MS27N	

Diam.	Width	WHEEL PART NR	VALVE PART NR	
22.5	x 8.25″	88354X	GAX70MS60N	
		88355X	GAX70MS45N	
		88356X	GAX70MS45N	
		8845XX	GAX70MS27N	
		8855XX	GAX70MS27N	
		88650X	GAX70MS27N	
		88651X	GAX70MS07N2	
		88652X	GAX70MS07N2	
		88653X	GAX70MS07N2	
		88655X	GAX70MS27N	
		886570	GAX83MS00N	WorkHorse® wheel
		886580	GAX83MS00N	WorkHorse® wheel
	x 9.00″	89352X	GAX70MS60N	
		89353X	GAX70MS45N	
		89355X	GAX70MS45N	
		8945XX	GAX70MS27N	
		8955XX	GAX70MS27N	
		89651X	GAX70MS07N2	
		89652X	GAX70MS07N2	
		89653X	GAX70MS07N2	
		896570	GAX83MS00N	WorkHorse® wheel
		896580	GAX83MS00N	WorkHorse® wheel
	x 11.75″	8105XX	GAX40MS00N	
		81151X	GAX40MS00N	
		81152X	GAX40MS00N	
		81251X	GAX40MS00N	
		81252X	GAX40MS00N	
		812570	GAX40MS00N	WorkHorse® wheel (offset 135)
		812580	GAX40MS00N	WorkHorse® wheel (offset 135)
		81352X	GAX40MS00N	
		81353X	GAX40MS00N	
		81354X	GAX40MS00N	
		81355X	GAX40MS00N	
		81356X	GAX40MS00N	Use extension GAX85 for wheels manufactured > 06.2000
		81455X	GAX40MS00N	Use extension GAX85 for wheels manufactured > 06.2000
		8145XX	GAX40MS00N	
		8155XX	GAX40MS00N	
		8165XX	GAX40MS00N	
		81751X	GAX40MS00N	
		81752X	GAX40MS00N	
		817570	GAX40MS00N	WorkHorse® wheel (offset 120)
		817580	GAX40MS00N	WorkHorse® wheel (offset 120)
	x 13.00″	83352X	GAX40MS00N	
		83353X	GAX40MS00N	
	x 14.00″	84151X	GAX40MS00N	
	x 15.00″	85052X	GAX40MS00N	
	x 17.00″	8405XX	GAX70MS07N2	22.5x17.00 (offset -67 mm)
		8425XX	GAX40MS00N	22.5x17.00 (offset -50 mm)

VALVES / PART NR	WHEEL PART NR
GAX40MS00N (straight) Replaces: BTR542, BTR552	7434XX
	81151X, 81152X, 81251X, 81252X, 81354X, 81355X, 81356X, 8145XX, 8155XX, 8165XX, 8175XX
	83353X
	84151X (22.5 x 14.00)
	8425XX (22.5 x 17.00 offset -50 mm)
	- Use extension valve GAX85 for 81356X & 81455X (> 06.2000)
GAX54MS00N (straight)	77345X (01.2008 >), 77346X (01.2008 >), 77347X (01.2008 >)
	78345X (01.2008 >), 78346X (01.2008 >), 78347X (01.2008 >)
GAX70MS07N2 (7°) Replaces: B70MS-07N	8405XX (22.5 x 17.00 offset -67 mm)
	87451X, 87452X, 87453X
	88651X, 88652X, 88653X
	89651X, 89652X, 89653X
GAX70MS27N (27°) Replaces: B70MS-27N, B60MS-27N, BV3-20-5	77345X (> 12.2007), 77346X (> 12.2007), 77347X (> 12.2007)
	78345X (> 12.2007), 78346X (> 12.2007), 78347X (> 12.2007)
	87450X, 87455X
	8845XX, 8855XX
	8945XX, 8955XX
GAX70MS45N (45°) Replaces: B70MS-45N, BTR543C	66340X, 66347X
	76347X, 76348X, 76448X, 76449X
	77340X
	78340X, 78342X
	88355X, 88356X
	89353X, 89355X
	- Wheels in this section are designed for drum brakes only
	- Extension valve GAX09070 is optional when single mounted
GAX70MS60N (60°) Replaces: B70MS-60N, BTR543D	66320X (10.2001 >)
	87352X
	88354X
	89352X
	- Wheels in this section are designed for drum brakes only
	- Extension valve GAX09070 is optional when single mounted
GAX83MS-00N (straight) Replaces: BTR544SP	88657X, 88658X
	89657X, 89658X
	- Wheels in this section are Workhorse® wheels
Extension valve for DUAL mounting	Use extension valve GAX09150 for all valves when dual mounted

VALVES / PART NR (OBSOLETE)	WHEEL PART NR & REPLACEMENT VALVES
BTR544D (60°)	66320X (> 09.2001) can be replaced with GAX70MS60N
	- Wheels in this section are designed for drum brakes only
	- Extension valve GAX09070 is optional when single mounted
BF8437 / BH-8437 (60°)	Can be replaced with GAX70MS-60N
	For Volvo with 87357X use extension GAX09070. Check clearance.
	- Wheels in this section are designed for drum brakes only
	- Extension valve GAX09070 is optional when single mounted
BTR543E (75°)	81352X, 81353X can be replaced with GAX40MS00N (straight)
	83352X can be replaced with GAX40MS00N (straight)

EXTENSION VALVES / PART NR	DESCRIPTION
GAX85	19 mm nickel plated valve extension, 24 mm overall length
GAX09070 Replaces B2412 and B2412N / B2414 and B2414N	54 mm plastic valve extension including dust cap, 72 mm overall length
GAX09150	133 mm plastic valve extension including dust cap, 151 mm overall length

VALVES FOR ALCOA WHEELS

The past two decades Alcoa wheels have been equipped with different types of valves. There are 3 types of designs that can be distinguished. This section allows one to replace nearly all valves found in wheels as from the early 90's with the latest version (see preceding tables).

Valves with orange or black O-ring
BTR542, BTR543C, BTR543D, BTR543E, BTR544 (all), BTR 545 (all), B60MS-27N, BV-3-20-5

Early versions. Nickel plated or chrome plated valves with O-ring. These valves do need lubrication / or greasing when checking or replacing.

Valves with black T-shape grommet and two piece nut
GAX70MS07N / B70MS-07N, B70MS-27N, B70MS-45N, B70MS-60N

Previous version. To have a better sealing on the inside, the O-ring is replaced by a larger T-shape rubber grommet. This also reduces the risk for galvanic corrosion between the valve and the inside of the valve seat. These valves do not necessarily need lubrication / or greasing when checking or replacing.

The 14 mm hexagonal nut of this valve is equipped with an integral plastic washer that also prevents galvanic corrosion on the outside. It also allows torquing the nut without damaging the valve seat. Once this valve has been loosened, it cannot be used anymore and has to be replaced by a new one or change to the same valve of the 2nd generation GAX70MS-07N2.

Valves with black T-shape grommet with one piece nut
GAX40MS00N, GAX54MS00N, GAX70MS07N2, GAX83MS00N (original equipment valves)
GAX70MS27N, GAX70MS45N, GAX70MS60N (replacement valves)

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Current versions. These valves come with a one piece nut with enlarged contact surface that evenly distributes the forces in the valve hole area. It also significantly reduces the chance of damaging this area when applying too much torque. When checked for proper functioning this type of valve can be used again. These valves do not necessarily need lubrication / or greasing when checking or replacing.

The 4 original equipment valves cover the entire range of currently produced wheels. These valves have slotted heads and a hex base which offer more grip and enable easy replacement with the use of a screwdriver or wrench.

The valve base of the 3 replacement valves is flat which enables a smooth transition surface from drop center to bead seat for this and older wheel generations. For easy fixation of these valves a 4.5 mm hex key can be used.

All new valves and nuts are nickel plated and come with a nickel plated dome type dust cap that includes a seal for 100% air tightness. Metal valve stem caps are recommended over plastic caps.

Valve nuts and torque

Alcoa valves have 14 and 16 mm hex nuts. Older US made wheels used 5/8" hex nuts for the valves. The recommended torque is 12 to 15 Nm (9 to 11 Ft-Lb).

GENERAL RECOMMENDATIONS

DO's

- To avoid loss of air by improper fitment or corrosion, Alcoa wheels should be fitted with chrome- or nickel plated valves that meet high standards and that are specially designed for Alcoa wheels.
- When inflating the tyre use dry air.
- Valve stem dust caps with an air seal are recommended.

DON'Ts

- Do not fit valves for steel wheels. Valves for steel wheels may have different diameters, different bends (angle) and / or insufficient thread length.
- Do not use brass valves. Aluminium and brass cause accelerated corrosion. Corrosion may result in leakage.
- Do not bend the Alcoa standard valve to another shape.
- Do not inflate the tyre with air coming from an air system using automatic lubrication for power tools.
- Do not use balancing liquids or balancing powder. These products may cause oxidation of the wheel's bead seat and drop center, as well as malfunctioning of the valve core with air loss as a result.
- Do not use metal or brass valve extensions without a solid support. Unsupported steel extensions accelerate fatigue to the valve base or valve hole area due to centrifugal forces. As a result cracks can occur in the valve base and / or the wheel's valve hole area causing air loss.
- Do not use flexible extension tubes without a proper clamping installation attached to the outer wheel. Loose extension tubes may cause damage to the wheel and valve with air loss as a result.

REPLACING VALVES

The best occasion to check the valve is when tyres are replaced. It is recommended to fit a new valve every time when a new tyre is mounted.

Before mounting the new valve check if the valve corresponds with the wheel. Use the preceding tables for reference. Always use silicone or EPDM O-rings / T-shape grommets - not rubber - when replacing the sealants.

Clean the valve seat and valve hole thoroughly after removal of the valve. Remove all dirt, grease and oxidation. Make sure all contact areas are dry.

Avoid using sharp tools and / or excessive force that could cause scratches or dents in the surface. Uneven or damaged surfaces can lead to leakage. Fine sandpaper, steel wool or a soft wire brush will help you to clean the area without harming the surface.

For valves with O-rings only:

Apply a layer of ALgrease in the valve hole and the outer and inner side wheel surface, up to 1" inch or 2 centimeters in diameter around the valve hole. Before installing the valve, apply some ALgrease on the shaft and base where the O-ring is located. Do not use any other lubricants that are water-based or contain metals.

Upon installing hold the valve in its position an check the alignment to be able to host a valve extension for dual mounting applications.

Install the valve with care and do not over torque: the recommended torque is 12 to 15 Nm (9 to 11 Ft-Lb).

VALVES AVAILABILITY

Two types of valves cover most common Alcoa wheels. Valves GAX70MS07N2 for current 8.25 & 9.00 truck and bus wheels and GAX40MS00N for most super single wheels.

Use original Alcoa valves only. These valves are specially made to fit Alcoa wheels and are not available in the after-market / replacement market. Alcoa has made all listed valves - starting with part number GAX - available to its complete dealer network in Europe. For more info please contact your local dealer, distributor or Alcoa Wheel Products Europe.

5.f. Valve extensions

Alcoa distributors offer different valve extensions. A quality extension of 150 mm will enable tyre pressure checks and adjustment of the inner tyre of a regular dual fitment.

Metal valve extensions for dual mounting may be used in conjunction with a support or valve stem stabilizer only. The mass of metal valve extensions and rotation may cause forces that can lead to cracks in the valve hole area of the wheel or the valve stem.

POM (Polyoxymethylene) valve stem extensions are recommended and can be obtained from your authorized Alcoa Wheel Distributor.

Check the status and torque of valves and valves extensions frequently.
For further information, consult the preceding tables and the Alcoa Wheel Specification Sheet.

5.g. Mounting tyres

European Alcoa wheels have a 15° bead seat angle and accommodate tubeless tyres with a 15° bead only. Never use tube type tyres or tyres with different angled beads on European Alcoa wheels.

- Do not use a wheel that has been exposed to excessive heat from tyre fires, brake fires, severe brake system drags or seizures or other causes.
- Do not use a damaged tyre or damaged wheel. Inspect them carefully before mounting.
- Use only the appropriate tyre size, matching the rim width, according to ETRTO and / or tyre manufacturer's recommendations.
- Check if the valve is mounted in the right way with proper torque.
- Apply ALgrease as rim protector and a tyre-mounting lubricant which does not contain metals and is pH neutral.

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Warning

Tyres that are not properly fitted or maintained may not work properly.

Failure to follow proper tyre fitment or maintenance practices may result in injury or death.

Follow the proper tyre fitment and maintenance practices as contained in the tyre manufacturers' manuals and sections 5.g. and 5.g.i. to 5.g.vi. of this manual.

Not all tyre mounting / demounting machines work alike. Be sure to read the operating or instruction manual for your particular machine before attempting to mount or demount tyres. Follow the particular operating and instruction manual.

- Refer to tyre manufacturer's recommendation for proper tyre pressure. Do not over inflate.
- Use a protective cage during inflation.
- Ensure that both tyre beads are properly seated: heavy duty truck tyres have a "guide rib" molded into the sidewall next to the tyre bead. When the tyre is inflated, this guide rib or ring should be evenly spaced from / parallel to the wheel rim all the way around the wheel. Check the position of the ring before removing the assembly from the inflation cage. If the ring and wheel are not concentric deflate the assembly in the cage and remount the tyre.

5.g.i. Recommendations for mounting tubeless tyres

Warning

Damaged tyres or wheels can lead to an explosive separation of tyres and wheels.

Explosive separation can cause serious injury or death.

Inspect tyres and wheels for damage before removing from vehicle. If damage is found, the tyre must be completely deflated before loosening cap nuts. Immediately and permanently remove damaged tyres or wheels from service.

Warning

Use of inner tubes in tubeless wheels will hide slow leaks. Slow leaks may indicate cracked (see Section 6.g.) or damaged wheels which lead to wheel failures.

Wheel failures can cause accidents which may result in serious injury or death.

Never use an inner tube on an Alcoa tubeless wheel. Immediately and permanently
remove cracked or damaged wheels from service.

NOTICE:

Alcoa aluminium duable wheels require special tyre mounting techniques, see Section 5.g.iii.

duable wheel

single wheel

1. Do not gouge or nick the wheel. Place aluminium wheels on clean wooden floor or rubber mat when hand mounting tyres. Additional care should be used when mounting Alcoa Dura-Bright® surface treated wheels since minor nicks and scratches cannot be polished out (see Section 7.b.). DiscMate™ wheel spacers are recommended for use with Alcoa Dura-Bright® surface treated wheels to protect the wheel contact surfaces from marring.
2. Always use a rubber, leather-faced or plastic mallet.
3. Inspect the wheel for damage. Do not use a damaged or severely corroded wheel (see Section 6.g.ii.).
4. Clean the tyre bead seat areas with a wire brush. Be sure the bead seat and drop center are dry before applying tyre lubricant.
5. Inspect the tyre for damage. Be sure the inside of the tyre is dry before it is mounted.
6. Use of a non-water-based lubricant is recommended as a rim surface protection and tyre mounting lubricant. Coat the entire rim surface (see Section 5.g.iii.).
7. Lubricate the rim and tyre bead immediately before mounting the tyre. Do not use any lubricant which contains water. Water-based lubricants can promote corrosion attack on the rim surface. The use of non-water-based lubricants is especially important when mounting tubeless tyres as the air in the tyre is contained by the seal between the bead and tyre rim.
8. Never lubricate the rim or tyre bead with a flammable solution. This can lead to an explosion during airing of the tyre or in subsequent operation of the vehicle (see below warning).
9. If using a tyre mounting/demounting machine on aluminium wheels, care should be taken to prevent gouging the wheel.
10. Use only dry air for tyre inflation. The use of moisture traps in the air compressor feed line is recommended.
11. Do not overinflate. Use the tyre manufacturer's recommended pressure, but under no circumstances exceed cold maximum inflation pressure.
12. When inflating a tyre always use a clip-on air chuck or threaded straight chuck and a remote valve with pressure gauge.

Warning

Never use a volatile or flammable material, such as ether or gasoline, as an aid to seating the tyre beads on the wheel can lead to an uncontrolled pressure buildup in the tyre and may result in an explosion.

Explosive separation of the tyre and wheel can occur while seating beads in this manner, while adding air to the tyre on or off the vehicle, or later on the road. Loss of vehicle control can result, which can cause serious injury or death.

Only use approved mechanical or pneumatic bead seating devices.

Warning

A pressurized tyre/wheel assembly can explode and separate violently.

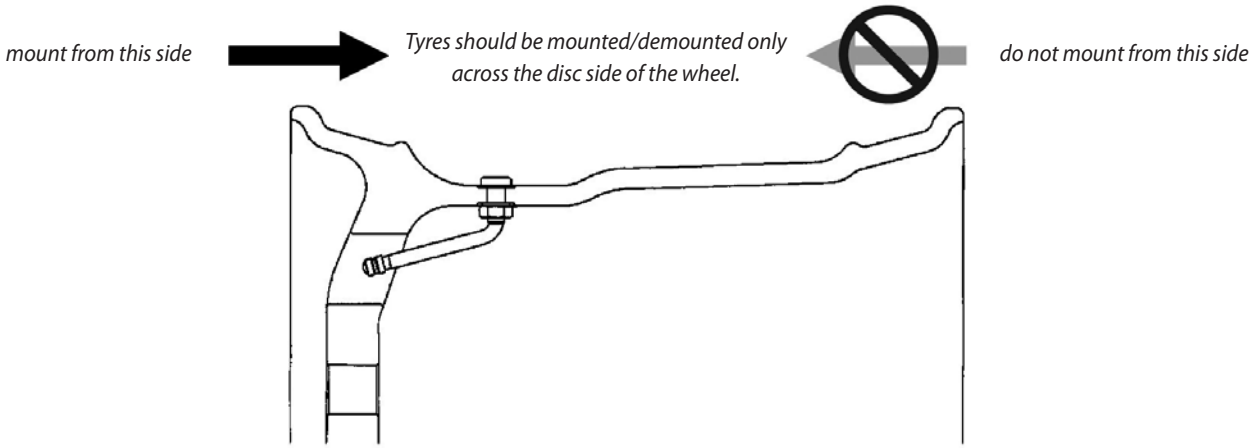
This violent separation can cause serious injury or death.

Always contain the tyre/wheel assembly in an inflation cage during inflation.

5.g.ii. Mounting tyres on non-symmetrical drop well wheels

Alcoa wheels often contain a symmetrical drop well with a narrow ledge on both sides of the rim. This feature allows mounting of the tyre from either side of the wheel. However, some Alcoa wheels are non-symmetrical and contain a narrow ledge on only one side of the wheel. Reduced well wheels as well as some other wheel designs feature an increased under well diameter and also have a nonsymmetrical sloping rim profile which provides additional brake clearance.

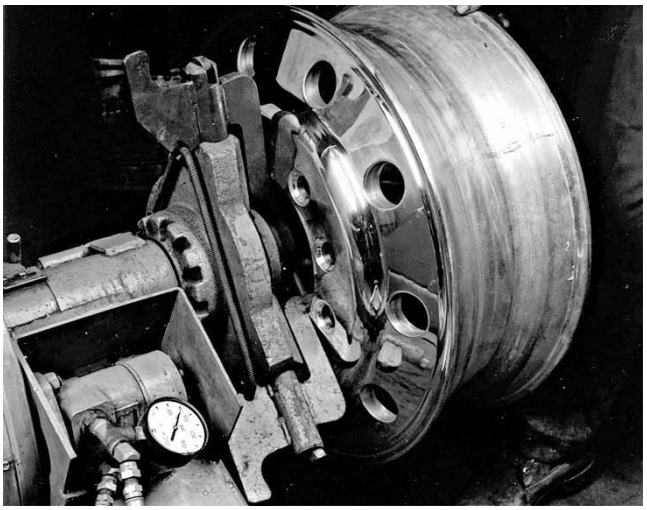
In order to minimize the possibility of tyre bead damage, all mounting and dismounting of the tyre should be performed only from the narrow ledge side of the wheel.



5.g.iii. Mounting tubeless tyres

NOTICES

- Do not exceed maximum wheel load. Customer must compare OEM vehicle load rating to maximum wheel load rating.
- Before mounting the tyre perform a wheel fitment check to insure proper clearance from any obstructions.
- When match mounting tyres on Alcoa wheels locate valve stem adjacent to low point mark on the tyre.
- Not all tyre mounting / demounting machines work alike. Be sure to read the operating or instruction manual for your particular machine before attempting to mount or demount tyres.
- Refer to tyre manufacturer's recommendation for proper tyre pressure.

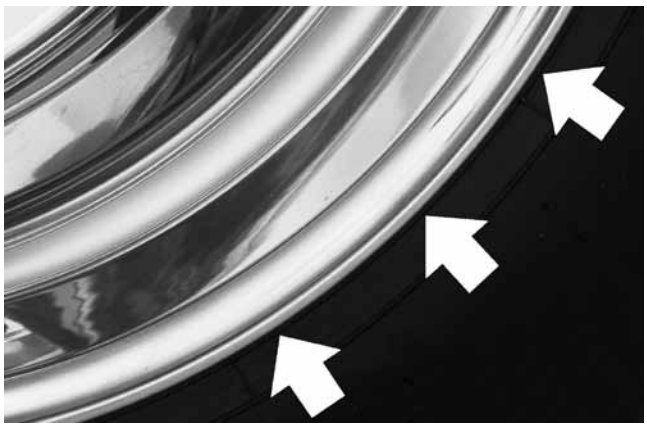


Position wheel on machine. Lubricate wheel (entire air chamber surface) and tyre bead using approved lubricant. Tyre beads should be mounted over the rim flange closest to the wheel well. Push bead over flange as far as possible.

Insert curved end of tool between bead and wheel flange with tool stop against flange. In circular motion, use short successive bites to work the bead over the flange. Push down on tool as bead is worked over flange.

Lubricate the second tyre bead. Start second bead into the well, holding it in position with the clamp to the rim flange. Lubricate bead half way around. With curved end of tool between tyre bead and flange, and the stop towards the wheel, push tool outward to work tyre over flange. Continue to pry bead over flange using the tool until remaining bead is over flange. Seat the tyre bead using an air ring or other mechanical bead seating aid.

Place tyre/wheel assembly inside safety cage or other suitable restraint. Refer to tyre manufacturer's recommendation for proper tyre pressure. Using a clip-on air chuck or a self-locking straight chuck with remote valve and pressure gauge, inflate the tyre/wheel assembly to proper pressure. If air escapes, roll tyre or use bead expander to force tyre beads against rim. Be sure to stay out of the path of potential exploding parts or air blasts.



Heavy duty truck tyres have a "guide rib" molded into the sidewall next to the tyre bead. When the tyre is inflated this guide rib or ring should be evenly spaced from the wheel rim all the way around the wheel. Check the position of the ring before removing the assembly from the inflation cage. If the ring and wheel are not concentric, deflate the assembly in the cage and remount the tyre.

5.g.iv. Recommendations for demounting tubeless tyres from Alcoa wheels

1. When hand demounting tyres from wheels, placing aluminium wheels on a clean wooden floor or rubber mat is recommended. Remove valve core/air from tyre wheel assembly prior to removal from vehicle. Additional care should be used when demounting Alcoa Dura-Bright® surface treated wheels since minor nicks and scratches cannot be polished out (see Section 7.b. for specific cautions, care and maintenance procedures).
2. Always use a rubber, leather-faced or plastic mallet.
3. Keep tyre tools smooth. Use them with care. Rim gouges or nicks may cause cracks.
4. If using a tyre mounting/demounting machine on aluminium wheels, care should be taken to prevent gouging the wheel.

Warning

An aluminium wheel can be structurally weakened by excessive heat.

Tyre/wheel assemblies using wheels that have been exposed to excessive heat may experience a sudden and unpredictable tyre/wheel separation causing serious injury or death.

Immediately and permanently remove any wheel from service that has been subjected to excessive heat (such as a tyre fire, wheel bearing failure or braking system drag/seize or a high pressure tyre/wheel separation.

Warning

Damaged tyres or wheels can lead to an explosive separation of tyres and wheels.

Explosive separation can cause serious injury or death.

Inspect tyres and wheels for damage before removing from vehicle. If damage is found, tyre must be completely deflated before loosening cap nuts. Immediately and
permanently remove damaged tyres or wheels from service.

5.g.v. Demounting of tubeless tyres

NOTICE

- Not all tyre mounting/ demounting machines work alike. Be sure to read the operating or instruction manual for your particular machine before attempting to mount or demount tyres.

Remove the valve core from the valve stem to ensure complete deflation. Place wheel on machine and position tool so flat end can be driven between tyre bead and rim flange. Straighten tool to a vertical position until bead is separated from wheel.

Repeat procedure at intervals until bead is totally separated from wheel. Repeat procedure on other side of tyre. Tyre is now ready for demounting. Lubricate the tyre bead.

Insert curved end of tyre tools between tyre and wheel, approximately 10 inches / 25 cm apart. Pull one tool toward center of wheel, then pull second tool in the same manner. To free bead, leave one tool in position, take out and reinsert the other tool, curved end between bead and flange, a short distance from the spanned area. Pry bead free of rim, repeating process until entire bead is free from wheel.

Insert straight end of tyre tool between beads and both rim flanges, hooking stop on the tool over second flange. Position inserted tool at 90° angle to tyre assembly at top of wheel and lubricate bead areas on both sides of tool. Lean tyre assembly toward tool and rock or bounce to pry off the tyre.

5.g.vi. Use ALgrease when changing tyres

Frequent changing of tyres in undesirable conditions, use of water-based lubricants for tyre fitting, as well as neglecting to clean the surface of the bead seat undoubtedly lead to loss of air caused by corrosion, oxidization of the aluminium and dirt build up.

Certain types of rubber can "fuse" to the bead seat of the wheel. If this rubber & other residues are not removed before the fitment of a new tyre the uneven surface can lead to loss of air.

Remove the valves core when cleaning the bead seats to avoid dirt build up in the valve-shaft, which could cause malfunctioning of the valve.

Before mounting a new tyre clean the bead seats thoroughly with a wire brush or an appropriate power tool until a smooth and clean surface is reached.
Avoid using strong abrasive tools and/or excessive force that could cause dents in the surface. Uneven or damaged surfaces can lead to leakage.

Apply a film of ALgrease to both bead seats, rim flanges, humps and curved sides of the rim well.

Also apply ALgrease to both beads of the tyre.
Proceed with mounting of the tyre according to mounting procedures and safety guidelines provided by the tyre manufacturers.

5.h. Balancing

Supersedes Balancing Manual 2005

Since Alcoa wheels are fully machined they do not require balancing. The tyre-wheel combination however may need corrective weighting. Liquid or powder balancing is not recommended. Preferably use coated balancing weights.

Regulations banned use of lead for balancing of cars and vans up to 3.5 T GVW. At the moment of writing balancing weights used for commercial vehicles over this GVW may still contain lead.

The past two decades Alcoa wheels came with different rim flange designs. There are 3 types of designs that can be distinguished. This section indicates how to properly balance wheels produced as from the early 90's.

Caution

Improperly installed weights could "fly off" during use and damage the vehicle or cause personal injury.

Always follow the recommended procedures in this manual or the balancing weight manufacturer.

1st generation of Alcoa wheel rim flange design

Clip-on weights

Below listed wheels can be balanced with clip on weights from Hofmann known as type 555 and 556. Exceptions included: some wheels continued to be able to host this type of balancing weights till today. For reference see part numbers.

Wheel size 1st gen.	Alcoa P/N
17.5 x 6.00 (1)	66320X, 66340X
17.5 x 6.75 (1)	66082X, 66347X, 66382X
19.5 x 6.75 (1)	76347X, 76348X, 76448X, 76449X
19.5 x 7.50 (1)	77340X
19.5 x 8.25 (1)	78340X
19.5 x 14.00 (2)	7434XX
22.5 x 7.50 (1)	8735XX
22.5 x 8.25 (1)	8835XX
22.5 x 8.25 (2)	8845XX
22.5 x 9.00 (1)	8935XX
22.5 x 9.00 (2)	8945XX
22.5 x 11.75 offset 0 (2)	81352X, 81353X, 81354X, 81355X
22.5 x 11.75 offset 120 (2)	81356X, 81455X
22.5 x 13.00 (2)	83352X, 83353X
22.5 x 14.00 (2)	84151X

1. Wheel sizes that use Hofmann type 555 for the closed side and 556 for the open side. These wheels can host adhesive weights Hofmann type 551-5 on the open side.
2. Wheel sizes that use Hofmann type 556 on both sides but are also able to host adhesive weights Hofmann type 551-5 on both sides except 8845XX, 8855XX, 8945XX and 8955XX.

2nd generation of Alcoa wheel rim flange design

Adhesive weights.

Below listed wheels can be balanced with adhesive weights only and do not host clip-on weights of any other make or kind.

Instructions for balancing Alcoa wheels with Hofmann adhesive weights type 551-5

- Alcoa wheels with part numbers mentioned below are designed for balancing with adhesive weights type 551-5* from Hofmann.
- Suffix 5* indicates blue taped adhesive weights with heat resistance up to 180° C.
- These wheels cannot be balanced with clip on weights Hofmann type 555 or 556.
- The weights should always be applied against the small hump / wedge i.e. as close as possible to the rim flange.

See chapter 5.h.ii. for instructions about application of adhesive balancing weights.

Wheel size 2nd gen.	Alcoa P/N
19.5 x 7.50	77345X, 77346X, 77347X
19.5 x 8.25	78345X. 78346X, 78347X
22.5 x 7.50	8745XX
22.5 x 8.25	8855XX, 8865XX
22.5 x 9.00	8955XX, 8965XX
22.5 x 11.75 offset 120	81456X, 81556X, 81557X, 81558X EU 81753X, 81755X, 81756X
22.5 x 11.75 offset 135	81652X, 81655X
22.5 x 17.00 offset -67	8405XX
22.5 x 17.00 offset -50	8425XX

3rd generation of Alcoa wheel rim flange design

During 2009 and 2010 all Alcoa wheels are subject to a transition towards rim flange designs that can host both clip-on and adhesive weights. The new clip-on weight however cannot be used at the 1st series of Alcoa wheels as listed above as the rim flange design is not the same.

Wheel size 3rd gen.	Alcoa P/N
22.5 x 11.75 offset 0	8105XX, 81251X, 81252X
22.5 x 11.75 offset 120	81751X, 81752X
22.5 x 11.75 offset 135	81151X, 81152X, 81257X, 81258X
22.5 x 15.00 offset 120	85052X

5.h.i. Balance weights clip-on type

Refers to 1st and 3rd generation of Alcoa wheel rim flange design

Balance weights for Alcoa wheels are available from your hardware supplier for tyre dealers. With radial tyres it may be necessary to temporarily reduce the tyre pressure when installing clip-on weights to allow clearance of the weight clamp over the rim flange. Use of coated balance weights is recommended to avoid staining and corrosion of the aluminium wheel surface.

Caution

Excessive rim flange wear (see Section 6.f.) could dictate the use of "stick-on" or adhesive wheel weights if there is inadequate rim flange to properly hold a clip-on style weight.

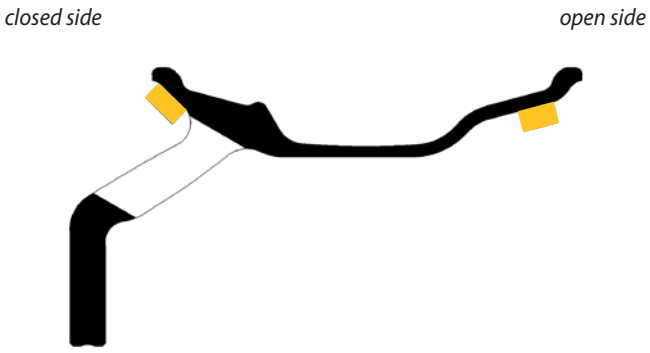
5.h.ii. Balance weights adhesive type

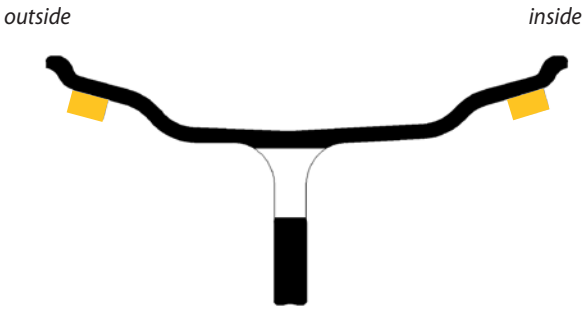
Refers to 2nd and 3rd generation of Alcoa wheel rim flange design

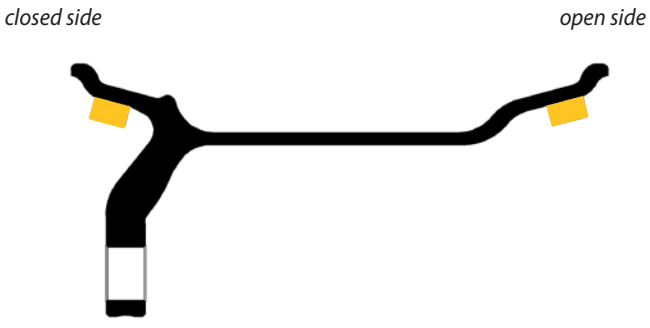
Adhesive weights should be applied only to a clean surface on sides and areas as indicated. These weights should be installed only in a location where they will not contact the brake, suspension, steering or other components during vehicle operation.

POSITIONING:
Both sides of the wheel have a designated area where the adhesive weights must be applied.

Wheels with the 2nd generation of Alcoa wheel rim flange design only:
The weights should always be applied against the small hump / wedge i.e. as close as possible to the rim flange.







PROCEDURE & DO'S:

1. Temperature
   The ambient temperature for sticking adhesive weights to wheels must be above 10° Celsius. The temperature of both wheel and adhesive weight must also be 10° C or more. Allow wheels to reach room temperature (at least 10° C) before applying adhesive weights.

2. Cleaning
   After determining how much weight must be applied, and at which position, the spots must be cleaned thoroughly and be completely free from dust, grease and silicones. This applies to both new and old wheels. Use silicon remover or another appropriate cleaner that removes silicones and grease. Silicones destroy the glue of the balancing weights and they will come loose.

3. Sticking
   Important is to avoid air bubbles or insufficient contact between the adhesive tape of the weight and the surface of the wheel. In this way cleaning detergents that contain silicon can destroy the glue and cause the balancing weight to come loose from the wheel. The weights must be applied with some force (5 kg thumb pressure) against the small hump at the designated areas.

4. Time
   Hofmann weights with blue tape (type 551-5) have a relatively low "initial glue force". The weight can be relocated immediately after sticking when balancing. The glue will reach its maximum holding force after 24 hours at room temperature.

At the closed side only Hofmann type 551 of 50, 75 & 100 grams can be used. If more than 100 grams are needed at this side the weights should be put behind each other.

The open side allows the use of Hofmann 551 types ranging from 50 to 225 grams.

Caution

Relocating wheels from a cold place to a warmer place causes condensation on wheel surfaces which will affect the adhesion negatively.

This condition leads to insufficient contact between wheel and adhesive weight.

It may cause the weights to "fly off" during use and damage the vehicle or cause personal injury.

DON'TS:

- Do not use 125 to 225 gram weights on the closed side: the width of these weights exceeds the available surface on this side.
- Do not use 250 and 300 gram weights at all: they are too wide for the closed side and too high for the open side. They may foul brake parts. Alternatively use more weights of smaller sizes.
- Do not apply any adhesive weights in other areas than designated as they may cause a foul condition.

For more information see Hofmann's web-address: www.dionys-hofmann.de

5.h.iii. Balance liquid or powder

Liquid or powder balancing is not recommended.

Caution

The policy of Alcoa Wheel Products is not to endorse any specific brand or entity of balancing powder.

The use of powder balancers in Alcoa wheels may cause clogged valves. The use of a filtered valve core is recommended when using balancing powder. Due to the design of Alcoa wheels and corresponding valves the installation of a long valve core or filtered valve core is not always possible.

The use of balancing powder will not void the warranty unless inspection of the wheel shows anomalies related to its use.

Caution

The use of liquid tyre balancers or sealants in Alcoa wheels may cause extremely rapid corrosion of the wheel rim surface.

Severely corroded wheels are unsuitable for service.

Alcoa wheels corroded by the use of liquid tyre balancers or sealants will not be replaced under the Alcoa limited warranty.

Liquid or powder balancers may harm the inner liner of tubeless tyres. For information see tyre manufacturers' recommendations.

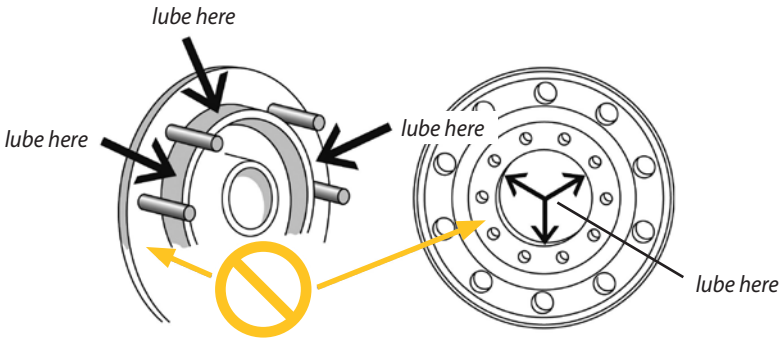
5.i. Lubrication / ALgrease

5.i.i. Lubrication of the hub and / or wheel hub bore

Prior to mounting hub piloted wheels, generously coat the wheel pilot or hub pads with a non-water based lubricant to minimize corrosion product build-up between the wheel and hub pilot. Excessive corrosion build-up between the wheel and hub pilots can make wheel removal difficult. Do not lubricate the face of the wheel, hub or brake drum (see illustration).

Lubricate the hub pads or the wheel hub bore generously with a non-water-based lubricant.

ALgrease or equivalent lubricants are heat resistant and are safe for aluminium and tyres. ALgrease can also be used for mounting tyres and valves. Other lubricants that are water based or contain heavy metals can accelerate corrosion and should not be used. ALgrease can be ordered from your Alcoa distributor. For more information on ALgrease see Alcoa Accessories Catalogue,

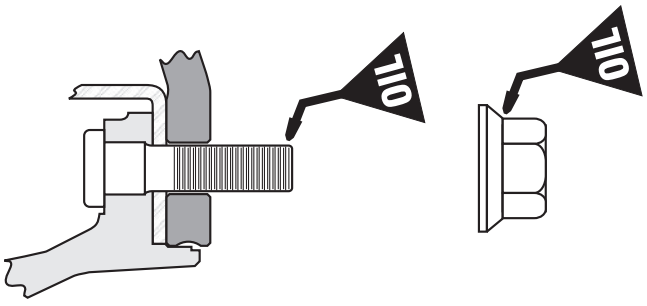


Do NOT lubricate the face of the hub, wheel face or brake drum.

5.i.ii. Lubrication of the studs & nuts

For nuts used on hub piloted wheels apply two drops of motor oil to the point between the nut and the integrated washer and two drops to the first two or three threads at the tip of each stud.

This will minimize corrosion between the mating surfaces. Lubrication is not necessary with new hardware.



lubricate here *lubricate here*

Do NOT lubricate the face of the hub, wheel face or brake drum.

5.i.iii. ALgrease

USE ALGREASE WHEN MOUNTING WHEELS

During the time that wheels are in service, dirt and other foreign matter accumulate around the wheel and hub area. Water and road-salt can then lead to oxidation in the center bore of the wheel. The centering spigots and especially the uninterrupted centering edges of the hubs are thereby causing the wheels to stick to the hubs, so that it becomes difficult to remove them.

To prevent wheels from sticking to hubs use ALgrease before mounting the wheel to the hub. If sticking occurred, once the wheel has been removed:

Clean the faces of the disc of the wheel and the hub that are in contact.

Clean spigots or centering edges of the hub as well as the inner side of the hub bore of the wheel thoroughly. Use a wire brush to remove traces of rust, oxides and dust.

Apply a thin layer of ALgrease on the inner side of the hub bore of the wheel and / or at the spigots or centering edge of the hub.

ALgrease is safe to use on aluminium and steel. It resists high and low temperatures. Parts and surfaces treated with ALgrease are protected from corrosion. It is recommended to use ALgrease each time wheels are fitted.

Do not apply ALgrease to the mating surfaces in the mounting area of the hub or the disc of the wheel.

Do not use any other lubricants that are water-based or contain heavy metals. Such products can lead to accelerated corrosion.

5.j. Wheel installation (to the hub)

Recommendations for proper installation of wheels

Check for and replace bent, broken, cracked or damaged studs. When replacing broken studs, always replace the studs on each side of the broken stud. If two or more studs are broken, replace all the studs for that wheel position. Check with the stud manufacturer for regular maintenance and stud replacement practices.
All wheel fastener hardware should be grade 8 or metric conversion 10.9. Follow the hardware manufacturer's recommendations when replacing studs.

NOTICES

- Perform a wheel fitment check to insure proper clearance from any obstructions.
- Do not exceed maximum wheel load. Customer must compare OEM vehicle load rating to maximum wheel load rating.
- Refer to tyre manufacturer's recommendation for proper tyre pressure. Before mounting the tyre.

Warning

Wheels that are not properly installed or maintained may not be safe or work properly.

Failure to follow proper wheel installation or maintenance practices may result in injury or death.

Follow the proper wheel installation and maintenance practices as described in this section.

1. Make sure all wheel nuts are properly torqued — check them often (see Section 5.n.ii.). If the wheel is loose, the holes will pound out (deform). If some cap nuts are tight and others are loose, the wheel may develop cracks or studs may break. This condition may cause wheels to loosen and disengage from the vehicle. Dirt streaks or rust radiating from stud holes can indicate loose nuts (see Section 5).
2. Be sure the end of the wheel wrench is smooth or cover the wheel mounting surface with a protective shield prior to tightening the cap nuts. The wrench end will mar the wheel around the cap nuts if it is not smooth.
3. Keep all component contact surfaces smooth and clean. Dirt or projections on mounting surfaces may lead to lose wheels. Remove all projections resulting from burrs, nicks, etc. Be sure that loose dirt does not fall onto mounting surface during assembly.
4. Do not introduce any foreign objects such as spacers or top hats into the contact surface areas of the mounting system unless approved by Alcoa. Do not paint Alcoa forged aluminium wheels.
5. Additional care should be used when mounting Alcoa Dura-Bright® surface treated wheels since minor nicks and scratches cannot be polished out (see Section 7.b., for specific cautions, care and maintenance procedures).
6. DiscMates™ are a protection gasket designed to be placed between the wheels and also between wheels and hub or brake drum contact surfaces (see Sections 5.g.i.). DiscMates™ are recommended to be replaced when the tyre/wheel assemblies are removed and reinstalled.

5.k. Hub centering

All European type Alcoa wheels for heavy duty commercial vehicles are hub centered wheels. European type Alcoa wheels have cylindrical boltholes and are not suitable for bolt centering with conical or spherical nuts: never use any kind of this type of hardware on European type Alcoa heavy duty wheels.

Hubs designed for steel hub piloted wheels may not have enough pilot tab length to locate dualled aluminium wheels. Pay close attention to pilot tab length, particularly when converting from steel to aluminium duals. Make certain the outer wheel is engaged and centered by the hub pilot pads.

Before purchasing Alcoa wheels always consult your truck, trailer or axle OEM: the pilot tab length for sufficient centering must be 5 mm or more for single mounting and 1x disc thickness + 5mm for dual mounting. In both cases dimensions are excluding bevelled edges. Longer spigots make mounting easier.

Always apply some ALgrease or non-water based lubricant on the spigots to reduce corrosion and make it easier to remove wheels when replacing tyres or for service.

5.l. Disc thickness & thread engagement

The mounting flange of Alcoa wheels is thicker (19.0 to 28.5 mm) than the mounting flange of steel wheels (10 to 13 mm) and therefore requires different mounting hardware.

For correct mounting of Alcoa wheels use:

- Longer (replacement) studs with standard nuts, as described in Section A hereafter, or
- Sleeved nuts (available from Alcoa) with standard length studs, as described in Section B hereafter

For reference see the latest Alcoa Wheel Specification Sheet with details about: wheel sizes, part numbers, dimensional properties such as disc thickness and applications.

Warning

Insufficient engagement of threading between stud and nut may cause cracking or breaking of the stud.

Insufficient engagement of threading between stud and nut could cause loss of the wheel.

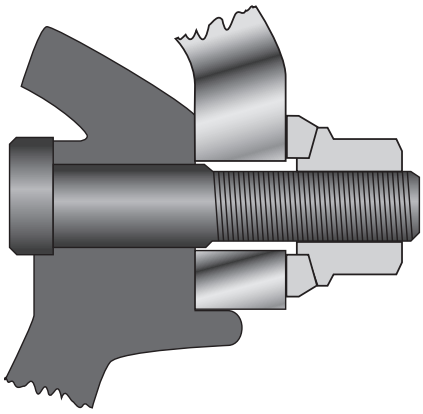
Failure to follow proper wheel installation or maintenance practices may result in injury or death.

5.m. Nuts & studs

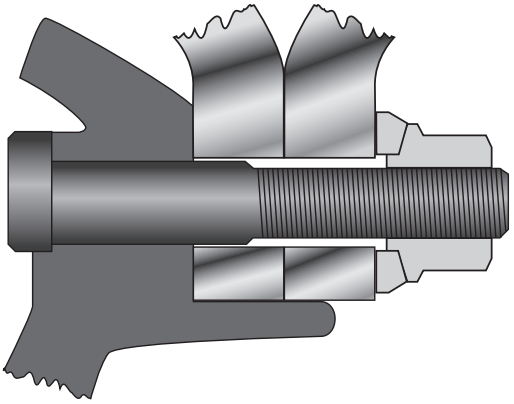
5.m.i. Section A, mounting Alcoa wheels with standard nuts & replacing wheel studs

The Alcoa wheel version for this type of mounting requires longer studs than for steel wheels. The stud standout must be long enough to cover the disc thickness of one or both wheels, the height of the wheel nut and additional two threads.

The stud standout must be checked very carefully. The stud standout is measured from the flat mounting surface of the hub, which is in contact with the disc of the wheel, to the outer end of the stud.



For single mounting the minimum stud standout required = disc thickness Alcoa wheel + height of standard nut + 3 mm** @ M22, M20 or M18 x 1.5



For dual mounting the minimum stud standout = 2x disc thickness Alcoa wheel + height of standard nut + 3 mm** @ M22, M20 or M18 x 1.5

** 2 full threads in case of 7/8"- 11 BSF or 7/8" - 14 UNF

NOTICE

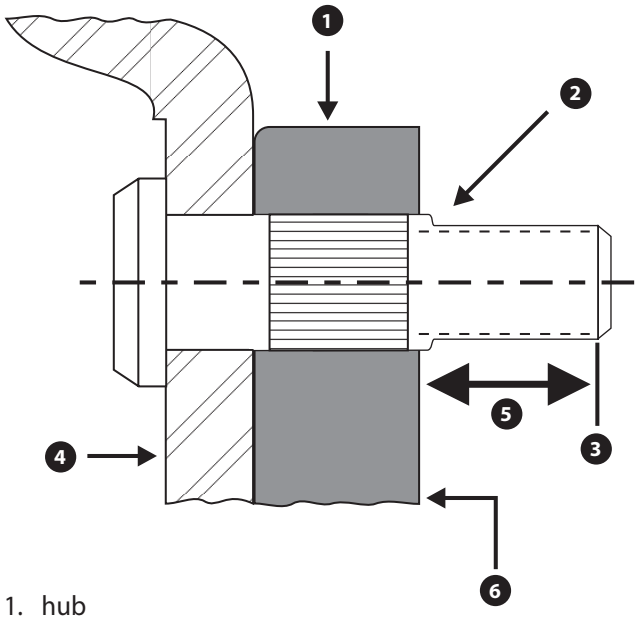
- If hex nuts with greater overall height are used, more stud length is required.

5.m.ii. Section A, how to measure stud standout?

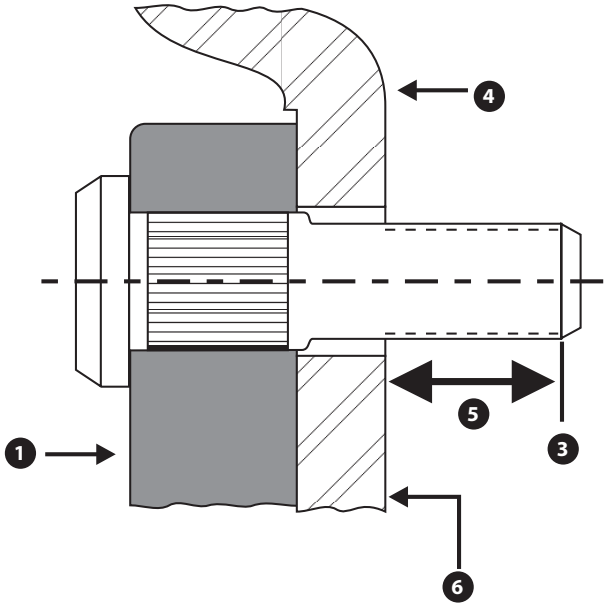
Stud standout is measured from the axle end mounting surface:

- i.e. the hub for disc brake operated axles and inboard mounted drums of drum brake operated axles to the first complete thread at the outside end of the stud
- i.e. the drum for outboard mounted drums of drum brake operated axles to the first complete thread at the outside end of the stud

inboard mounted drum



outboard mounted drum



1. hub
2. exposed shoulder
3. first full thread
4. drum
5. stud standout
6. mounting surface

For safe mounting with replacing wheel studs the stud standout must cover:

Single mounting:
For use with 2 piece flange nuts and replacing studs the minimal stud standout must be:

- 1x disc thickness Alcoa wheel + height of nut + 3 mm for use with M22, M20 or M18 x 1.5 threads (or 2 full threads in case of other type of threading such as BSF or UNF)
- Example 1x 22.5 x 9.00 Alcoa wheel with 22 mm disc thickness and a regular 2-piece flange nut M22 x 1.5 result in a stud standout of 22 + 27 + 3 = 52 mm

Dual mounting:
For use with 2 piece flange nuts and replacing studs the minimal stud standout must be:

- 2x disc thickness Alcoa wheel + height of nut + 3 mm for use with M22, M20 or M18 x 1.5 threads (or 2 full threads in case of other type of threading such as BSF or UNF)
- Example 2x 22.5 x 9.00 Alcoa wheels with 22 mm disc thickness and a regular 2-piece flange nut M22 x 1.5 result in a stud standout of 2x 22 + 27 + 3 = 74 mm

Stud availability

Consult your truck or trailer OEM for availability of longer replacement studs in case of 26, 24 or 21 mm mounting system, i.e. longer studs & standard nuts.

Extra long studs

Some trailer axle manufacturers offer axles with "combined" or extra long stud lengths, suitable for both thinner steel wheels and thicker aluminium wheels. In some cases Alcoa wheels can be mounted without replacing studs or purchase of sleeved nuts. To determine correct & safe fitting follow the procedure as described in this section.

5.m.iii. Section B, mounting Alcoa wheels with standard studs & Alcoa sleeved nuts

The standard wheel stud length can accommodate Alcoa wheels with more disc thickness when a special sleeved nut is used. The shank or sleeve of these nuts extends into the mounting holes and compensates the standard stud length securing sufficient thread engagement. Only use the Alcoa wheels with an appropriate mounting hole diameter to allow the sleeve of the nut to easily pass through it.

Sleeved nuts are available for:

- 32.0 mm mounting hole diameter for mounting with sleeved nut:
  - M22 x 1.5 (Metric, Volvo 2005 >)
  - 7/8"-11 BSF (Scania)
  - 7/8"-14 UNF (Volvo > 2004)
- 30.0 mm mounting hole diameter for mounting with sleeved nut:
  - M20 x 1.5 (Metric)
- 26.5 mm mounting hole diameter for mounting with sleeved nut:
  - M18 x 1.5 (Metric)

For reference see Alcoa Wheel Specification Sheet for bolthole diameters. If in doubt consult your Alcoa dealer, distributor or Alcoa Wheel Products Belgium.

To ensure correct mounting with sleeved nuts there must be enough thread engagement:

The recommended length of engagement between the threads of the stud and the sleeved nut is equivalent to 95% or more of the diameter of the stud.

The minimum recommended number of thread engagement between stud & nut is:

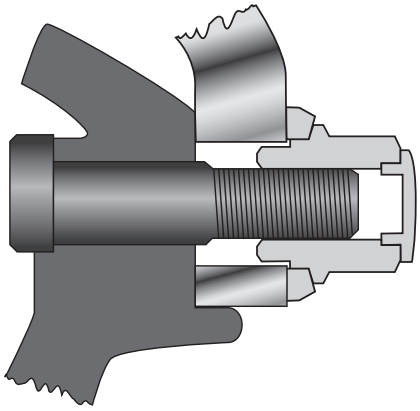
- 14 full turns for M22 x 1.5 (Metric, Volvo 2005 >)
- 13 full turns for M20 x 1.5 (Metric)
- 12 full turns for M18 x 1.5 (Metric)
- 10 full turns for 7/8"-11 BSF (Scania)
- 12 full turns for 7/8"-14 UNF (Volvo > 2004)

Engage a single wheel or dualled wheels to the hub with at least two nuts securing the wheels. Tighten one nut by hand and count the number of full turns till the nut sits snugly.

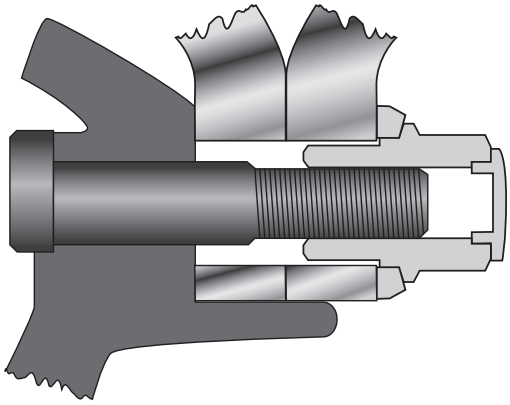
Do not center hub piloted type wheels with sleeved nuts

The sleeves of the nut do NOT center the wheel(s); this mounting system still requires a hub piloting or hub centering axle. The pilot tab length for sufficient centering must be 5 mm or more for single mounting or 1x disc thickness + 5mm for dual mounting, excluding bevelled edges (both single and dual).

Short and long sleeved nuts are available from Alcoa in thread sizes for all European vehicles. The torque to obtain the correct clamping force is recommended by your truck / trailer or axle manufacturer.



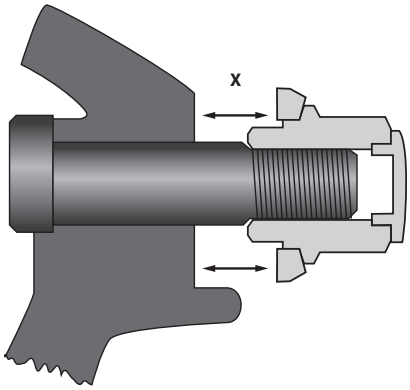
Single mounted wheels require sleeved nuts with a short sleeve



For dual mounting wheels must be mounted with long sleeve nuts

Studs with unthreaded part / bottom out

Studs that have an unthreaded part or exposed shoulder can cause incorrect or no clamping of the wheel(s) at all. Sleeved nuts may "bottom out" on the stud's unthreaded part or exposed shoulder even before the wheels are clamped correctly.
Before mounting Alcoa wheels on hubs with such studs the space between the washer and the hubs mounting face must be determined.



This space (x) must be 2 mm less than the disc thickness of the Alcoa wheel to be accommodated. Determine this space when the nut is bottomed out at the stud without a wheel mounted.

Studs

In service, stud dimensions and condition may change over time due to environmental conditions, multiple re-installations, improper torquing and other factors. Consult with your hub and stud manufacturer for regular maintenance recommendations and stud replacement practices.

Check for and replace bent, broken, cracked or damaged studs. When replacing broken studs, always replace the studs on each side of the broken stud. If two or more studs are broken, replace all the studs for that wheel position.

All wheel fastener hardware should be grade 8 or metric conversion 10.9. Follow the hardware manufacturer's recommendations when replacing studs.

5.n. Wheel Nuts

Warning

Use of chrome-plated cap nuts which have chrome plating on the surfaces which contact the wheel can cause reduced and inconsistent wheel clamping.

This condition can cause wheels to loosen and disengage from the vehicle, causing serious injury or death.

Never use cap nuts with chrome-plated contact surfaces. Use only recommended hardware on Alcoa aluminium wheels.

5.n.i. Two piece hex head nuts

Design and specifications of nuts used for Alcoa wheels comply with DIN standard 74361. European Alcoa wheels are used with two piece hex head nuts that have following threading:

- M22 x 1.5
- M20 x 1.5
- M18 x 1.5
- 7/8" - 11 BSF
- 7/8" - 14 UNF

NOTICE:

- One-piece nuts are not approved for use on any Alcoa wheel application.
- Only two piece nuts or two piece sleeved nuts with an integral, freely turning washer designed for hub centering mounting systems must be used for fastening European Alcoa wheels for heavy duty vehicles.
- Regular nuts that come with truck or (trailer)axles with steel wheels can also be used with Alcoa wheels with corresponding bolt hole diameters given the thread engagement is sufficient (see section 5.l. and 5.m.).
- Following 2 piece hex head sleeved nut types are available from Alcoa:
  - M22 x 1.5 (Metric, Volvo 2005 >)
  - M20 x 1.5
  - M18 x 1.5
  - 7/8"-11 BSF (Scania)
  - 7/8"-14 UNF (Volvo > 2004)
- Some vehicles come equipped with right-hand and left-hand threads. These vehicles have on the right side right-hand threads and on the left have left-hand threads. The "R" and "L" on the studs and nuts indicate right and left-hand threads respectively.

Alcoa P/N	Thread size	For	Sleeve	Application
GAX578032	M22 x 1.5	Metric, Volvo 2005 >	Short	Single
GAX57803201*	M22 x 1.5	Metric, LH thread	Short	Single
GAX578132	M22 x 1.5	Metric, Volvo 2005 >	Long	Dual
GAX57813201*	M22 x 1.5	Metric, LH thread	Long	Dual
GAX614230	M20 x 1.5	Metric	Short	Single
GAX614330	M20 x 1.5	Metric	Long	Dual
GAX542026	M18 x 1.5	Metric	Short	Single
GAX542126	M18 x 1.5	Metric	Long	Dual
GAX578432	7/8"-11 BSF	Scania	Short	Single
GAX578532	7/8"-11 BSF	Scania	Long	Dual
GAX578232	7/8"-14 UNF	Volvo > 2004	Short	Single
GAX578332	7/8"-14 UNF	Volvo > 2004	Long	Dual

(*)The extension 01 on cap nut part numbers indicate left-hand thread versions.

NOTICE:

- Though sleeved nuts are designed to compensate stud length sufficiently a minimal stud standout i.e. thread engagement is required (see section 5.m.iii. and 5.m.iv.).

5.n.ii. Tightening nuts

Two-piece flange nuts M22 x1.5, M20 x 1.5, M 18 x 1.5, or 7/8 - 11 BSF or 7/8 - 14 UNF may be subject to different torque requirements. Inquire at the manufacturer of the vehicle or axle for proper torque values or refer to the owner's manual of the vehicle.

Position one of the hub's pilot pads at the twelve o'clock position. After positioning wheels on the pilot pads, hand tighten all two-piece flange nuts, then tighten to the recommended torque following the proper sequence shown below for your type wheel.

After 5-50 miles / 8-80 kilometer of operation torque should be rechecked, unless your documented fleet practices determine otherwise. Check torque frequently from then on.

Nuts must be kept tight, and studs and nuts should be checked frequently.

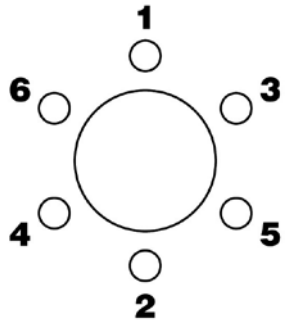
Impact wrenches, if used, should be carefully adjusted to apply torques within the limits recommended. Torquing of nuts should be done in recommended sequences.

After each wheel mounting, nut torque should be checked with a torque wrench. Nuts should be retorqued if necessary.

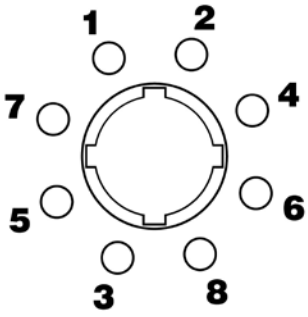
At tyre changes, nuts and studs should be inspected to be sure they are in good condition. If cracks and stripped or damaged threads are found, remove these nuts from service. Check wheel studs accordingly.

NOTICE:

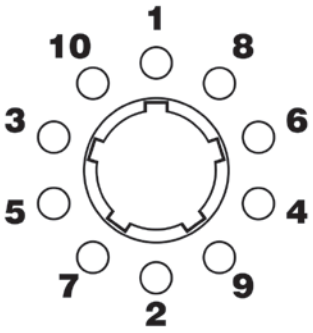
- If nuts require frequent tightening, studs break frequently, wheel nut washers break or bolt holes are pounding out, hardware and mounting practices should be reviewed.



Six Stud



Eight Stud



Ten Stud

Warning

LUBRICATION

Lubricants should not be applied to the cap nut's washer i.e. nut-to-wheel contact surface.

Application of excessive lubricant to the threads of the stud and or nut can cause excessive torque. Over torque can stretch studs causing them to fail.

Oiled washers can lead to over-torquing which can stretch studs causing failure of studs. Failed studs can cause the wheel to disengage from the vehicle, causing serious injury or death.

Lubricants must be completely removed from the cap nut's washer i.e. nut-to-wheel contact surface if applied accidentally.

Do not allow oil to contact mounting surfaces of the wheel, hub or drum. Do not use aerosol cans for lubrication of stud threads.

See section 5.i. Lubrication / ALgrease.

UNDER & OVER TORQUE

Undertorqued nuts allow wheels to run loose, pounding out (deforming) the bolt holes, fatiguing studs or losing nuts, as well as cause cracks in the bolt hole area.

Over torquing can stretch studs causing them to fail with loss to torque and may cause pre-mature fatigue.

Both under and over torquing can lead to wheel dis-engagement causing serious injury or death.

Check all parts, including wheels, studs and nuts. Check mounting faces of wheels, hubs and drums. Check for dirt, corrosion or damage. Remove dirt and rust; replace damaged parts. Follow correct tightening sequences and torque levels.

5.n.iii. Keep wheel nuts tight

Wheel cap nuts must be kept tight. Check all cap nuts for proper torque after the first use or any removal. Inspect wheels and check wheel nuts during service stops. Dirt streaks from cap nuts may indicate looseness.

Flange nuts must be kept tight, and studs and nuts should be checked frequently. At tyre changes nuts and studs should be inspected to be sure they are in good condition. If nuts require frequent tightening or studs break frequently, hardware and mounting practices should be reviewed.

For proper nut torque, refer to the chart below:

Hub piloted using two-piece flange nuts

Mount type	Nut Thread	Torque Level Nm
Metric	M18 x 1.5	340 – 400
Metric	M20 x 1.5	380 – 450
Metric *1	M22 x 1.5	610 – 675
Scania	7/8 – 11 BSF	540 – 660
Volvo*2	7/8 – 14 UNF	640 – 700

For proper installation of two-piece flange nuts, two drops of motor oil should be applied to the point between the nut and flange and two drops to the first two or three threads at the tip of each stud (see Section 5.n.ii.).
*1 Including Volvo from 2005
*2 Volvo up to 2004

NOTICE:

1. If using specialty fasteners (cap nuts), consult the manufacturer for recommended torque values.
2. Tightening wheel nuts to their specified torque is extremely important. Under tightening which results in loose wheels can damage wheels, studs and hubs, and can result in wheel loss. Over tightening can damage studs, nuts and wheels and results in loose wheels as well.
3. All torque wrenches, air wrenches and any other tools should be calibrated periodically to ensure the proper torque is applied.

5.n.iv. Dualing with steel wheels

When dualing steel wheels with Alcoa aluminium wheels, follow the steel wheel manufacturer's recommendations regarding the proper torque and use of thread lubricants to mount the wheel.

See Section 4.g.

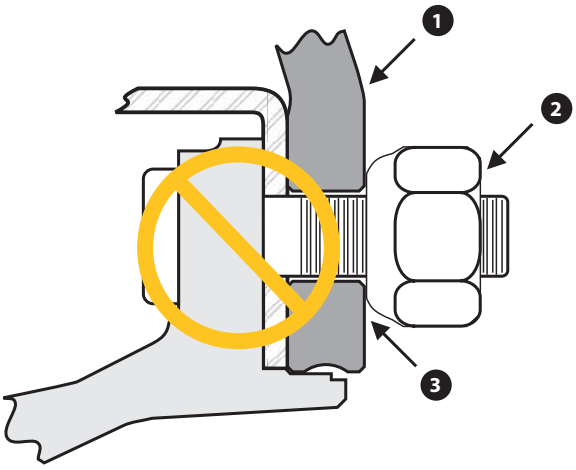
Warning

When mounting painted steel inner dual wheels with outer aluminium wheels, be cautious of excessive paint build-up on the inner steel wheel.

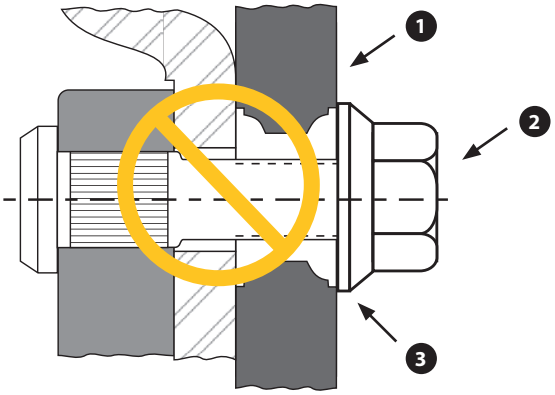
Excessive paint can reduce the clamping force and allow the wheels to become loose which can lead to serious injury or death.

5.n.v. Incorrect assemblies

The following are examples of incorrect wheel assemblies.



1. hub piloted Alcoa aluminium wheel
2. ball seat cap nut
3. insufficient contact area



1. Stud located, ball seat aluminum wheel
2. two-piece flange nut
3. little (if any) contact area

- Do not use sleeved cap nuts on wheels designed for use with extended studs.
- Do not use two piece flange nuts on wheels designed for use with sleeved cap nuts.
- Do not use Volvo OE sleeved cap nuts on any other type of wheel.
- Do not use two-piece flange nuts with stud located ball / conical seat wheels.
- Do not use ball seat or conical seat cap nuts with hub piloted wheels.

Warning

Using the wrong wheel nuts can cause loss of torque, broken studs and cracked wheels, conditions which can lead to serious injury or death.

Use only hardware designed specifically for each wheel type.

See Section 5.m. and 5.n. for proper hardware assemblies.

6 Wheels in service

6.a. Avoid abuse

Abuse can shorten the life of a wheel. Lack of care in changing a tyre, heavy pounding of the wheel rim, overloading, exposure to excessive heat or hitting curbs at high speed or a sharp angle can damage wheels.

Do not overinflate. Use the tyre manufacturer's recommended pressure, but under no circumstances exceed cold inflation pressure. Before mounting the tyre perform a wheel fitment check to insure proper clearance from any obstructions.

6.b. Inspect thoroughly and frequently

Safe operation requires thorough examination of wheels and attaching hardware, at frequent intervals, both on and off the vehicle.

Wheels that have been in service need to be inspected at regular intervals to assure proper and safe performance.

It is not always possible to predict the useful life of a wheel. Wheels will eventually wear out. Generally, older wheels and wheels operating in extreme conditions should be examined more frequently for obvious signs that they should be removed from service.

Examine all exposed areas frequently. Clean wheels and look for cracks or other damage. Also check the inner dualled wheel when the outer wheel is removed.

During tyre changes, thoroughly examine the entire wheel. Pay particular attention to the rim contour and the surfaces of the rim.

Warning

Damaged tyres or wheels can lead to an explosive separation of tyres and wheels. Explosive separation can result in serious injury or death.

Inspect tyres and wheels for damage before removing from vehicle.

If damage is found, tyre must be completely deflated before loosening wheel nuts. Remove damaged tyres or wheels from service.

6.c. Heat damage

Inspect for exposure to excessive heat. A wheel that has been subjected to excessive heat may appear charred or burned. A wheel that has been exposed to excessive heat may appear to be in good condition if it has been cleaned. Do not use any wheel that has been overheated regardless of appearance. Even if a wheel does not appear to be obviously burned, check labels, tyre bead, brake components and DiscMate™ for evidence of charring, melting, blistering or burning.

A wheel may discolor from excessive heat. It can show a dull grayish color and will not polish to a bright finish as a typical wheel would.

Any wheel run with a flat tyre longer than the time necessary to immediately pull off the road should be checked for excessive heat damage.

Warning

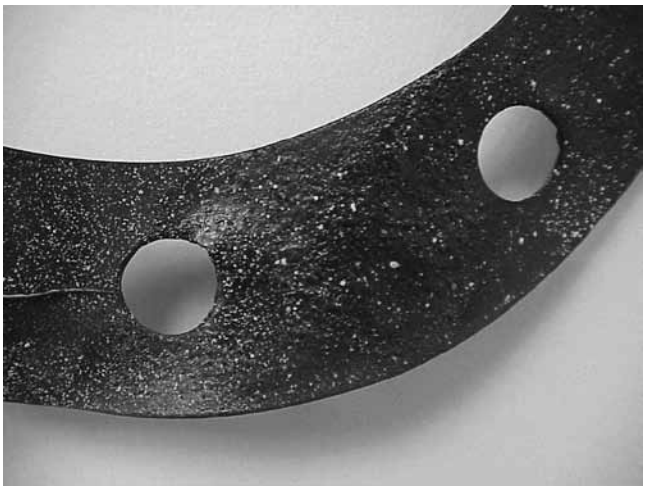
Excessive heat from fire, brake malfunction, wheel bearing failure, tyre failure or other sources may weaken the metal and cause the wheel/tyre assembly to separate explosively.

Exploding wheel/tyre assembly can cause serious injury or death.

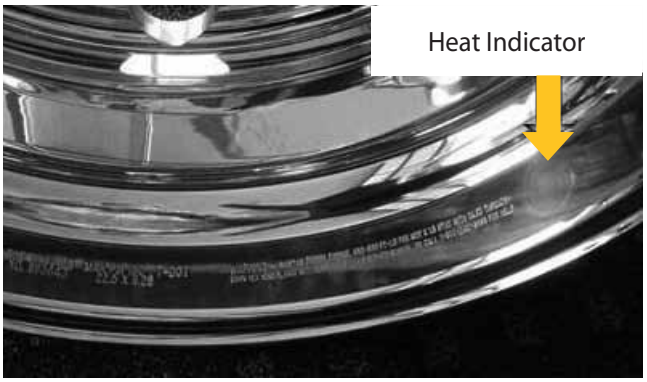
Immediately and permanently remove from service any wheel that has been exposed to excessive heat.

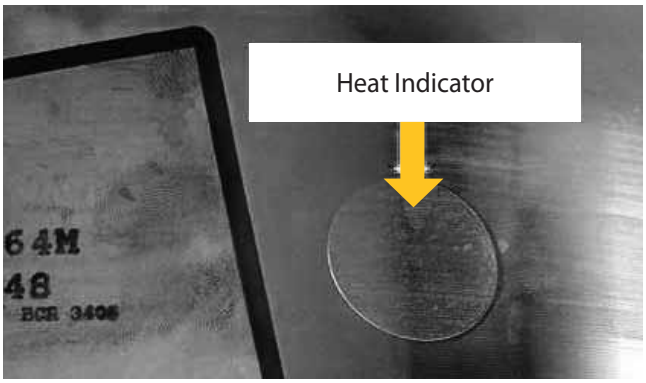
A blistered, blackened or cracked looking logo decal on an Alcoa wheel may indicate that the wheel has been exposed to excessive heat as shown in picture to the right, or discoloration of the wheel as shown in picture below.

After January 2009 the new Alcoa logo may not show heat damage.



Inspect all axle end components for signs of exposure to excessive heat. Pay particular attention to brake drums or discs. If one of these components show signs of overheating, the entire assembly, including the wheel, should be replaced.





Wheels manufactured as from February 2009 will have a 1 in. or 2,5 cm clear round heat indicator sticker located next to the roll stamp on the inside shown on the left and right, along with the same 1 inch clear round heat indicator sticker located on the tyre side drop well as shown in the photo above.

If either of these round labels show signs of blistering, charred, blackened, or cracked look, this may indicate that the wheel has been exposed to excessive heat.

Warning

IF ANY OF THE CONDITIONS AS DESCRIBED ON PAGE 52 ARE SEEN, REMOVE THE WHEEL FROM SERVICE IMMEDIATELY.

THIS INCLUDES ANY HEAT DAMAGE TO THE TYRE, DISCOLORATION TO THE WHEEL AND / OR BRAKE PARTS, AS WELL AS ANY BURNT OR CHARRED LABELS.

6.d. Dimension checks

Open side circumference check

Warning

Wheels that have been subjected to high pressure tyre and rim separation or excessive heat damage may no longer have sufficient dimension and contour to retain the tyre bead while under pressure.

Exploding wheel/tyre assembly can cause serious injury or death.

Immediately and permanently remove from service any wheel that has been exposed to high pressure, tyre and rim separation or excessive heat.

Warning

Wheels that have been run flat or have other physical damage may no longer have sufficient dimension and contour to retain the tyre bead while under pressure.

Rims that lack proper dimension and contour can lead to explosive separation of the tyre and rim, causing serious injury or death.

Any wheel that has been in service must be inspected prior to mounting. Follow dimension check procedures described in this section during each wheel inspection.

Dimension checks / best inspection method: with a wheel rim ball tape

Photo shows a wheel rim ball tape.
Measure the circumference of the bead seat on the open side with a ball tape.

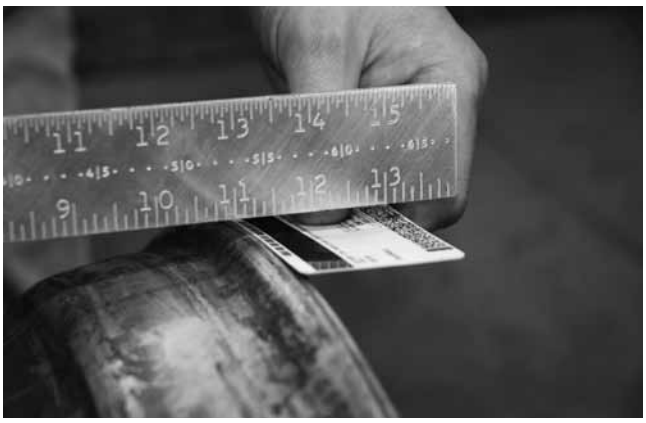
The circumference of the bead seat on the open side of the wheel should be checked at each tyre change. The open side is the side opposite the disc face. In the case of center flange wide base wheels, or wheels with insets less than 76 mm or 3 inches, both rim flanges should be checked. Any wheel should be inspected prior to mounting. If the circumference of the bead seat does not match the required dimension as indicated by the wheel rim ball tape, immediately and permanently remove the wheel from service.

Ball tapes used for measuring wheel circumference can be purchased from
MAKRA Manfred Kratzmeier GmbH
Werner-von-Siemens-Straße 15
76694 Forst / Baden
Germany

Dimension checks / 2nd best inspection method: if a ball tape is unavailable, use a carpenter square

ACCEPTABLE

Photo above shows carpenter square even on both bead seats.



UNACCEPTABLE

Photo above shows an undersized wheel where you can clearly place a credit card (approximately 0.030 in. or 0,76 mm) between the square and the wheel.

THIS INSPECTION TECHNIQUE ONLY APPLIES TO DUAL OR DISC FACED WHEELS.

Check all wheels at each tyre change for proper contour of the open side of the rim. Place the long leg of a carpenter square across the center of the disc side of the wheel. Extend the short leg across both rim flanges of the wheel as shown on page 54. Repeat this process at four equidistant points around the wheel.

The short leg should touch both rim flanges at each point. If a distance greater than the thickness of a credit card (0,76 mm or 0.030 in. feeler gauge) appears between the short leg and the rim flange, the wheel should be permanently removed from service and scrapped.

Dimension checks / 3rd best inspection method: rolling wheel as described below

If a ball tape or carpenter square is unavailable, roll the wheel, without a tyre, a minimum of 10 feet or 3 meters over a smooth, flat, level, clean surface, such as asphalt or concrete pavement. Any deviation from rolling in a straight line is an indication of a potential lack of proper dimension and contour. Remove the wheel from service until it can be properly checked with a ball tape.

IF YOU DO NOT FULLY UNDERSTAND ANY OF THESE INSPECTION METHODS AS DESCRIBED IN THIS SECTION CONTACT ALCOA AT +32 (0) 11 458 460 FOR CLARIFICATION.

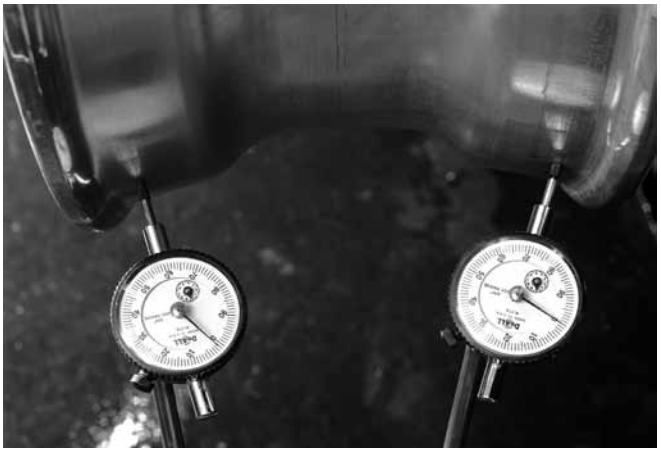
duable wheel

single wheel

6.e. Tyre wear or ride problems

If you experience tyre wear or ride problems it may be helpful to check radial run out. Remove the wheel from the vehicle, deflate and remove the tyre (see Section 5.g.v., for recommendations and instructions for demounting tubeless tyres).

Remount the wheel on the vehicle without the tyre. Be sure to follow proper mounting procedures to assure the wheel is well centered on the hub. Place a dial indicator as illustrated in this picture to trace the bead seats of the wheel. Rotate the wheel noting the amount of variation shown on the dial indicator. Alcoa aluminium wheels should be tested for radial run out only at the bead seat surface. A total indicator reading of 1,0 mm or 0.04 inch or less is acceptable.



Tyre wear can also be caused by improperly seated tyres. Inspect the tyre for proper seating on the wheel. The tyre beads may not be seated properly. If so, remove the wheel from the vehicle, deflate and break the bead seats (see Section 5.g.v. for recommendations and instructions for demounting tubeless tyres). Adequately lubricate the bead seats and properly reseat the tyre beads. Re-inflate the wheel in a safety cage or other suitable restraint.

6.f. Rim Flange Wear

It is recommended to read this and following sections before putting Alcoa wheels in service.

Rim Flange wear is not a warrantable condition. Only Dura-Flange® wheels have a 24 month warranty period against wear which creates a sharp edge that would require maintenance.

Irregular wear on the surface of the rim flange is caused by abrasion from the tyre bead and sidewall. Rim flange wear happens most often in applications with heavy or shifting loads. If you are experiencing excessive rim flange wear in your operation, consider using Alcoa Dura-Flange® aluminium wheels. These wheels have been specially treated to significantly reduce rim flange wear.

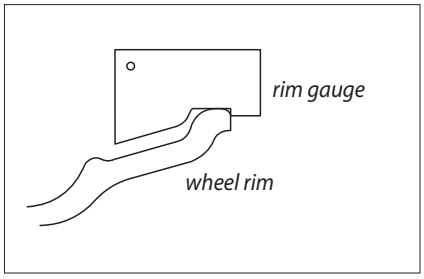
For infomation consult www.alcoa.com/alcoawheels/europe/en/info_page/duraflange.asp

Remove wheels from service when rim flange wear is excessive. Excessive wear can be determined using an Alcoa approved wear gauge and procedures detailed under section 6.f.ii. If rim flange wear creates sharp edges and/or cuts the tyre, see Edge Removal Procedures detailed under section 6.f.iii or contact Alcoa for recommended maintenance procedures.

6.f.i. Alcoa Rim Flange Wear Gauge instructions

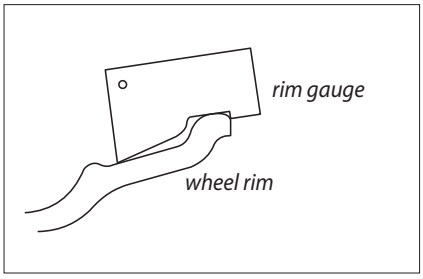
THESE GAUGES ARE TO BE USED FOR RIM FLANGE WEAR ONLY. THEY ARE NOT A BEAD SEAT ANGLE OR DIAMETER TOOL.

rim acceptable



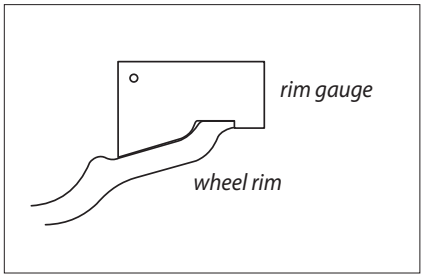
daylight in this area indicates acceptable rim

rim acceptable



daylight in this area indicates acceptable rim

rim NOT acceptable



no daylight in this area indicates excessive wear

6

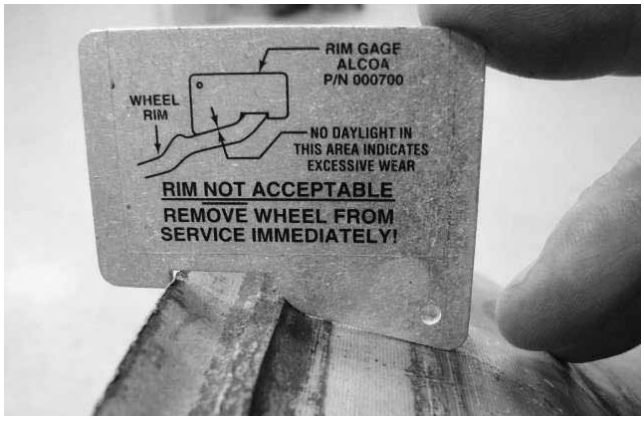
6.f.ii. Determining Rim Flange Wear

STEP 1.
Remove the wheel/tyre assembly from the vehicle. Remove the valve core to deflate the tyre completely. Remove the tyre from the wheel according to the section Mounting Alcoa wheels with Tubeless Tyres (Section 5.g.iii.).

STEP 2.
After the wheel is separated from the tyre, verify if the circumference of the bead seat on the open side is acceptable (see Section 6.d.). Check the wheel flange with the Alcoa rim flange wear gauge to determine if the wheels must be removed from service for excessive rim flange wear (right photo "unacceptable").

See rim flange wear gauge instructions on the illustrations above to make this determination. If you do not have an Alcoa rim flange wear gauge, contact Alcoa Wheel Products Europe to obtain a gauge(s) at no charge by calling +32 11 45 84 60 or emailing info.wheels@alcoa.com.

acceptable

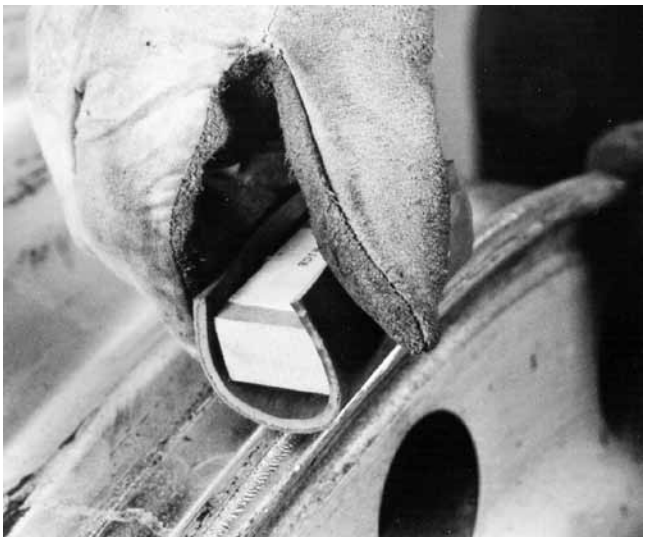


unacceptable

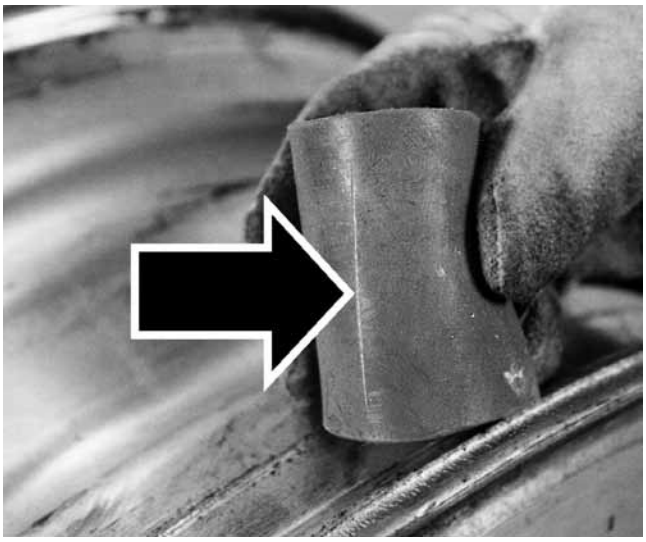
STEP 3.

If the wheel is deemed to be serviceable by the rim flange gauge, examine the wheel flange edge for sharpness by using a rubber sharpness gauge. These gauges are made by attaching a section of tyre side wall or a suitable piece of rubber to a block of wood.

By running the sharpness indicator gauge along the wheel in the area of the wear, determine if the wear is sharp enough to cut or damage the rubber on the sharpness indicator. If the rubber is cut, then follow these edge removal instructions.



A rubber sharpness gauge or a suitable piece of rubber attached to a block of wood.



Run the sharpness indicator gauge along the wheel in the area of the wear to determine if the wear is sharp enough to cut or damage the rubber on the sharpness indicator.

NOTICE

If the flange cuts or appears close to being sharp enough to cut the rubber on the sharpness indicator gauge, the edge can be removed per the edge removal procedures on page 59. If the rubber is not cut, then the wheel can be returned to service without further work for rim flange wear.

Examine the tyre for cuts in the bead area and side wall. If no damage occurred to these areas, return the tyre to service. Cut tyres should be removed from service. The tyre should be inspected at this time for any other damage and be treated per normal tyre procedures recommended by the tyre manufacturer.

Check the wheel at every tyre change or ONCE PER YEAR for rim flange wear and any sharp edges. If you follow this practice, you will significantly reduce the possibility of a rim flange cutting into the tyre.

Caution

Do not run unprotected hands or fingers across worn rim flange areas of used wheels.

Worn rim flange areas are sharp and can cut hands or fingers. Cuts can lead to infection.

Always wear gloves when handling used wheels or when testing for edge sharpness.

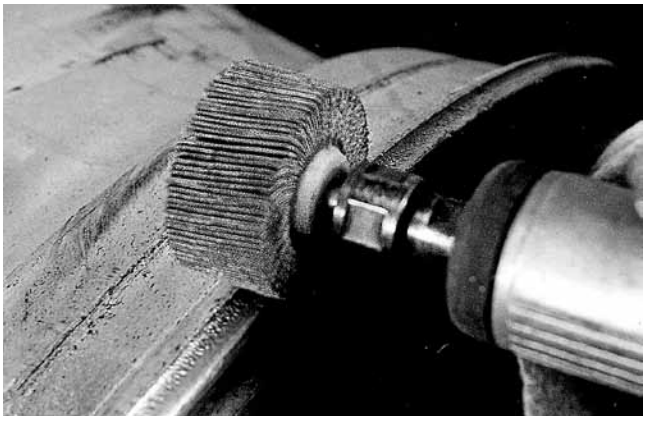
6.f.iii. Rim flange maintenance / edge removal procedures

There are many tools available to remove the sharp edge on the wheel caused by rim flange wear. Here are some examples of commonly used tools:

File

A file can be used very effectively to remove the sharp edge.

Air or electric power sander



This provides a very quick and effective method of removing the sharp edge. Operators should use all care to keep a uniform edge when using these tools.

Air or electric grinder

Another quick and effective method of removing the sharp edge caused by rim flange wear. Be careful as grinding pads may "gum up" from the aluminium that is removed. Care must be used to avoid gouging the wheel.

Die grinder

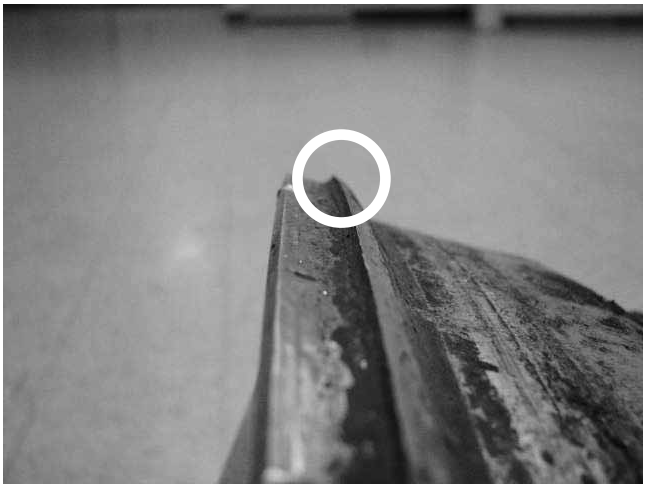
Used with a sanding wheel, cutting stone or grinding tool, this is a version of an electric grinder. This tool is very quick and effective as well, and care must be taken to remove metal as uniformly as possible and not to gouge the wheel.

Caution

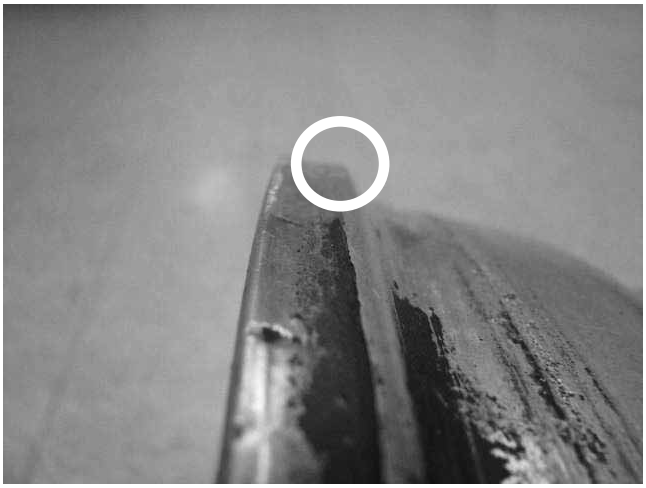
Removing sharp edges with hand or power tools produces metal filings and sparks. Many power tools have edges that are sharp or may become hot during use. Some power tools produce excessive noise when used.

Metal filings can be sharp and, when projected by the action of power tools, can cause serious skin or eye damage. Excessive noise from power tools can harm hearing. Sharp edges can produce cuts and hot surfaces can cause burns. Cuts and burns can lead to infection.

Always wear appropriate safety gear such as protective eye wear, gloves, protective clothing and hearing protection when using hand or power tools.



severe rim flange wear



sharp edge removed

STEP 4.
These photographs show the process of removing the edge. Using whatever tool is selected, work the tool around the wheel's circumference removing only enough material to eliminate the sharp edge. This should only be a small amount of metal. Perform this work on both flanges if there is evidence of sharpness.

Regardless of the method which you choose, the objective is to remove only the sharp edge. Remove just enough metal to smooth the edge. Take care to make sure the edge removal is as uniform as possible. Avoid gouging the wheel.

STEP 5.
After the edge is removed, run the sharpness indicator gauge along the area of edge removal to check for any remaining sharpness. If the rubber is still cut, perform the steps again to remove the sharp edge. Always remove the minimum amount of material necessary to eliminate the sharp edge.

STEP 6.
Check the rim flange height with the Alcoa Rim Flange Wear gauge to make sure there is adequate height remaining to safely support the tyre. Be sure to move the gauge all around the wheel's circumference and make sure that no area of the flange is below what the gauge indicates is acceptable. If the entire wheel flange is within the limits of the rim flange wear gauge, the wheel may be returned to service.

STEP 7.
Always inspect the wheel for any other conditions that would warrant removal from service.
See sections 6.b., c., d.

Warning

Welding or brazing the rim flange or any area of an Alcoa aluminium wheel will weaken the wheel. Weakened or damaged wheels can lead to an explosive separation of tyres and wheels or wheel failure on the vehicle.

Explosive separations of tyres and wheels or wheel failure on the vehicle could cause serious injury or death.

Never attempt to weld or braze any surface of an Alcoa aluminium wheel.

Warning

Excessive heat from fire, brake malfunction, wheel bearing failure, tyre failure or other sources may weaken the metal and cause the wheel/tyre assembly to separate explosively.

Exploding wheel/tyre assembly can cause serious injury or death.

Immediately and permanently remove from service any wheel that has been exposed to excessive heat.

Warning

Returning wheels to service with inadequate flange height as determined by the Alcoa Rim Flange Wear Gauge can lead to an explosive separation of tyres and wheels.

Explosive separation can cause serious injury or death.

Wheels with flange height that falls below the Alcoa gauge have inadequate rim flange height to support the tyre on the rim. Immediately and permanently remove any wheel from service that has inadequate rim flange height.

NOTICE
Excessive rim flange wear (see Section 6.f.) could dictate the use of "stick-on" or adhesive wheel weights if there is inadequate rim to properly hold a clip-on style weight.

6.f.iv. Dura-Flange®

If you are experiencing excessive rim flange wear in your operation, consider using Alcoa Dura-Flange® aluminium wheels. These wheels have been specially treated to significantly reduce rim flange wear. Only Dura-Flange® wheels have a warranty on rim flange wear against sharp edges for a 24 month warranty period.

Dura-Flange® has a 24 month warranty against wear which creates a sharp edge that would require maintenance as per Section 6.f.iii. Rim flange maintenance.

NOTICE
Minor wear or minor pitting is not a warrantable condition. Edge re-conditioning cannot be performed on Dura-Flange® wheels including those described in the rim flange maintenance Section 6.f.iii.

The Alcoa Dura-Flange® leaflet is available on www.alcoa.com/alcoawheels/europe/en/info_page/downloads.asp

6.g. Cracked or damaged wheel checks

Warning

Cracked or damaged wheels may fail or come off the vehicle.

Wheels that fail or come off the vehicle while it is moving can cause serious injury or death.

Immediately and permanently remove cracked or damaged wheels from service.

Visually inspect wheels for cracks or damage. Remove wheels from service with known or suspected damage.

6.g.i. Mounting area

Stud hole cracks are usually caused by improper torquing (see Sections 5.n.ii. and 5.n.iii.), excessive loading or insufficient mounting flange support by the hub or brake drum. Remove wheel from service.

Shown right are stud hole cracks emanating from bolt hole to bolt hole. Causes are: undersized diameter of wheel support surface, support surface not flat, incorrect attachment parts (see Section 5.c.) and insufficient torque (see Sections 5.n.ii. and 5.n.iii.). Remove wheel from service.

Support surface should be flat to the diameter recommended on the chart in section 5.c.

Inspect the hub / drum contact area thoroughly for cracks or other damage.

6.g.ii. Corrosion

Certain environments can lead to corrosion. Some of the more common corrosives are: salt, magnesium chloride and calcium chloride compounds used for snow removal and highly acid or alkaline materials. If the air used to fill tubeless tyres, or the tire itself is not dry, the areas of the wheel under the tyre can corrode severely.

Remove wheels from service with severe hub bore corrosion.

Bead seat, valve stem and hub bore corrosion often are caused by entrapped moisture. Mild corrosion should be removed thoroughly by wire brush and the rim protected with non-water-based tyre lubricant (see Section 5.j.). Remove any severely corroded wheel from service.

Caution

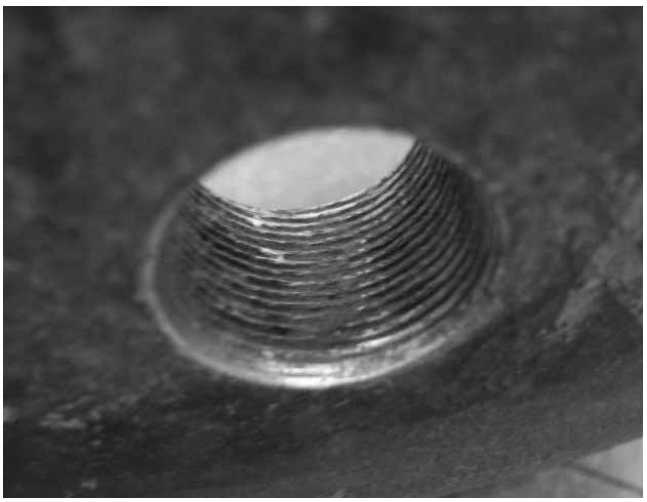
The use of liquid tyre balancers or sealants in Alcoa wheels may cause extremely rapid corrosion of the wheel rim surface.

Severely corroded wheels are unsuitable for service.

Alcoa wheels corroded by the use of liquid tyre balancers or sealants will not be replaced under the Alcoa limited warranty.

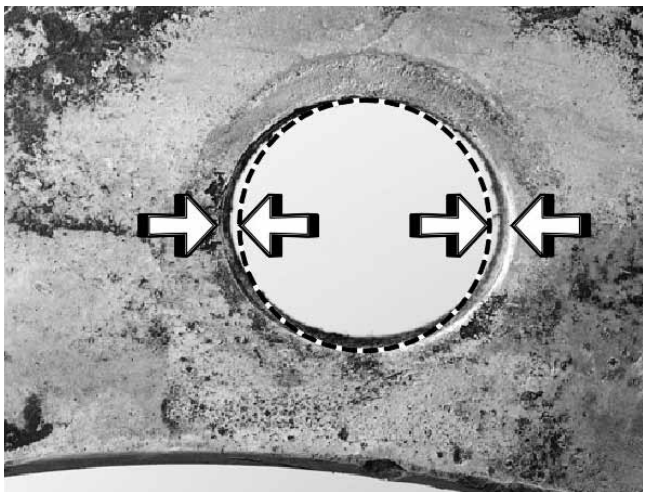
6.g.iii. Bolt holes

If wheels are run loose, both stud located wheels and hub piloted wheels can be damaged. Look for wallowed out or elongated ball seats on stud located wheels. On hub piloted wheels look for elongated stud holes. Over torquing can lead to damaged ball seats on stud located wheels and can damage the disc surface of hub piloted wheels. Remove damaged wheels from service.



UNACCEPTABLE

For hub piloted wheels - normally if you see thread marks on the inside diameter of the bolt holes, this would indicate the wheel ran loose.



UNACCEPTABLE

For hub piloted wheels - normally if you see a wallowed out bolt hole, this would indicate the wheel ran loose.

6.g.iv. Disc area

Inspect both sides of disc area for hand hole cracks. If cracks are found, remove the wheel from service.

Hand hole cracks are normally caused by overloading of the wheels.

6.g.v. Rim area

Check the entire rim area for nicks, gouges and cracks. Loss of air may be caused by cracks in areas around the valve stem hole. Remove the wheel from service.

Cracks in areas around the valve stem hole are normally caused by overloading of the wheels.

6.g.vi. Bead Seat area

Loss of air may be caused by cracks in the bead seat areas around the rim. Remove the wheel from service.

Bead seat cracks are normally caused by overloading of the wheels.

7 Care and Maintenance

Regular cleaning

Clean the wheels regularly with steam or high-pressure water. The use of a mild detergent is recommended. Do not use harsh alkaline / acid cleaners.

Use ALclean and ALpolish

Alcoa Brushed & Mirror Polished wheels are uncoated. The highly corrosion resistant alloy that is used for Alcoa wheels reduces oxidation to a minimum. Maintaining the original luster of the wheels is easy with ALclean and ALpolish. Regular and frequent maintenance will keep your wheels bright and shiny for years.

Alcoa Dura-Bright® wheels only need soap and water washing to stay bright. These wheels should not be polished with standard polishes such as ALpolish.

Corrosion

Due to aluminium's natural resistance to corrosion, Alcoa forged aluminium wheels do not need to be painted. Certain environments, such as livestock hauling can lead to corrosion. Other potentially corrosive materials include salt, highly alkaline substances and chloride compounds. Using ALprotect reduces corrosion and improves the protection of your wheels.

For information consult www.alcoa.com/alcoawheels/europe/en/info_page/wheelcare.asp

7.a. Maintenance against corrosion Brushed and Polished wheels (non-Dura-Bright® surface treated wheels)

The following information is for standard Alcoa forged aluminium wheels without the Dura-Bright® surface treatment. See Section 7.b. for specific instructions on the care and cleaning of Alcoa Dura-Bright® surface treated wheels.

1. Clean frequently with high pressure water from a hose. The use of a mild detergent will speed the cleaning process. Do not use strong cleaners.
2. When tyres are removed the entire wheel must be cleaned and inspected. With a wire brush, remove any foreign products from the tyre side of the rim. Do not use a wire brush to remove dirt and corrosion products from the appearance surface of the wheel. Generously coat the entire air chamber surface with an approved surface protection and lubricant each time the tyre is removed (see Section 5.i.iii.).
3. To maintain the original appearance of your Alcoa wheels, the following procedures are recommended:
   a. After installing new wheels and prior to operating your vehicle, use a sponge, cloth or soft fiber brush to wash exposed wheel surfaces with a mild detergent and warm water solution.
   b. Rinse thoroughly with clean water.
   c. Wipe dry to avoid water spots.
   d. Clean your Alcoa truck wheels as frequently as required to maintain their appearance.

For reference see the Wheel Care section on www.alcoa.com/alcoawheels/europe/en/info_page/wheelcare.asp

7.b. Maintenance & cleaning Dura-Bright® surface treated wheels

1. The Dura-Bright® surface treatment is designed to be easy to clean and generally only requires water. If soils attached to the surface do not come off with cold water, try warm water and wipe with a soft towel or chamois material. If soils remain, use warm water and a mild detergent (with assistance of a commercial high pressure power washer, if available). Always dilute the detergent according to the manufacturer's recommendation; never use the detergent straight without diluting with water. **In the mixed, diluted state the cleaner acidity / alkalinity should have a pH between 5 and 9.** Avoid cleaners that contain hydrochloric, sulfuric, nitric or hydrofluoric acid. The latter, hydrofluoric acid, often used in car / truck wash pre treatment routines for wheels should never be used on Dura-Bright® treated wheels.

2. When tyres are removed, the entire rim must be cleaned and inspected (see Section 6.b.). With a soft brush, remove any foreign products from the rim (portion of the wheel that supports the tyre). Generously coat the entire air chamber surface with an approved surface protection and lubricate each time the tyre is removed (see Section 5.g.ii.).

3. Once in service, Dura-Bright® wheels can become nicked or scratched by road debris and/or mechanical damage. If this occurs, continue to follow the normal washing and cleaning instructions provided above.

4. Even as durable as Dura-Bright® wheels are, the mounting area can become scratched, marred or discolored when mounted against another wheel, hub or drum. The use of a wheel mounting surface guard, such as DiscMates™, are highly recommended.

Note: pH value can be found in chemical MSDS (Material Safety Data Sheet). If the cleaner is in concentrated form, contact your cleaning chemical supplier to determine the proper dilution and pH value.

NOTICE

For maintenance of Dura-Bright® wheels that were and are subject to damage, erosion and discoloring of the Dura-Bright® treatment, refer to the Dura-Bright® service bulletin of May 2009. This bulletin is available upon simple request from Alcoa Wheel Products Europe, tel. +32 11 45 84 60.

7.c. Maintenance Dura-Flange® wheels

1. Edge re-conditioning cannot be performed on Dura-Flange® wheels.
2. Dura-Flange® has a 24 month warranty against wear which creates a sharp edge that would require maintenance.
3. Minor wear or minor pitting is not a warrantable condition.

8 Glossary of common terms and conversion factors

8.a. Glossary of common terms

1/2 DUAL SPACING - One half the distance between the two center lines of dualed wheels. The dimension is the same as the OUTSET dimension.

15° The angle of the tyre bead's surface as used for tubeless tyres and wheels for medium and heavy duty vehicles.

1-PIECE FLANGE NUT - A one-piece washer and nut combination not recommended for use on any Alcoa wheel application.

2-PIECE FLANGE NUT - A two-piece washer and nut combination used to secure hub piloted wheels.

AIR CHAMBER - The space enclosed by a tyre and wheel rim or inner tube (latter not applicable for EU type wheels).

BEAD SEAT - The area along the outer edges of the rim where the mounted tyre and rim are in contact.

BOLT CIRCLE - The circle defined by the centers of the bolt holes (stud holes) of a wheel, dimensions stated in diameter inches or millimeters (EU).

BOLT HOLE - Hole found in the disc of the wheel through which the bolt (stud) passes.

BORE - See "HUB BORE."

CENTER BORE - See "HUB BORE."

CLOSED SIDE - the disc face side of the wheel.

DC - Abbreviation for drop center.

DISC AREA - The vertical wheel face which supports the rim.

DISCMATE™ - (wheel gasket) A nylon 6-6 gasket that goes between the hub or brake drum and wheel and / or between two wheels to protect against corrosion.

DISC WHEEL - A one-piece (forged) or two-piece (welded) assembly of a disc and a rim.

DROP CENTER - The well or center portion of the wheel rim that enables the fitment of tubeless tyres.

DUAL WHEEL - Any wheel that can be mated disc side to disc side with another wheel resulting in an inner and outer dual wheel assembly.

FOOT-POUNDS / NEWTON METERS - The measure of the amount of torque applied to a cap nut or other part. May be measured with a torque wrench.

Ft-lbs - abbreviation for Foot-pounds (torque measurement).

HUB BORE - The center hole of a disc wheel, dimensions stated in inches or millimeters (EU).

HUB PILOTED MOUNTING - A wheel mounting system which uses the hub to center the wheel and two-piece flange nuts to secure it.

in. - Abbreviation for inches.

INNER CAP NUT - Cap nut used to mount the inner wheel in a dualed stud located wheel system (not applicable for EU type Alcoa wheels).

INSET - The distance from the wheel mounting surface to the rim centerline when the centerline is placed inboard of the mounting surface.

kg - Abbreviation for kilogram (weight measurement), equal to 1000 grams.

kPa - Abbreviation for kilo Pascals (pressure measurement).

LONG CAP NUT - A retrofit cap nut with a long extension sleeve used to secure dualed wheels (see also SHORT CAP NUT).

MAXIMUM INFLATION - The highest amount of air pressure allowed, measured at normal ambient temperatures, approx. 20° C or 68 F.

mm - Abbreviation for millimeters.

NEWTON METERS / FOOT-POUNDS - The measure of the amount of torque applied to a cap nut or other part. May be measured with a torque wrench.

Nm - Abbreviation for Newton meters (torque meaurement).

OFFSET - See "OUTSET" & "INSET" - The distance from either wheel mounting surface to the rim centerline.

OPEN SIDE - The side of the wheel opposite the disc face.

OUTER CAP NUT - A cap nut used to secure the outer stud located wheel in a dualed wheel pair and threaded onto the inner cap nut (not applicable for EU type Alcoa wheels).

OUTSET - The distance from the mounting surface of the wheel to the rim centerline when the rim centerline is mounted outboard of the hub face. This dimension is the same as the 1/2 DUAL SPACING dimension.

PILOT TAB or PAD / SPIGOT - The raised surfaces / parts on a hub used to center a hub piloted wheel.

PSI - Abbreviation for pounds per square inch (pressure measurement).

REVERSIBLE - Term applied to a disc wheel which can be reversed on the hub without changing the position of the tyre centerline.

RIM CENTERLINE - A line to the radial axis of the wheel running through the midpoint between the rim flanges.

RIM FLANGE - That portion of the rim which extends above the rim surface which retains the tyre bead.

RIM - That portion of the wheel which supports the tyre.

SHORT CAP NUT - A retrofit cap nut with a short extension sleeve used to secure single wheels (See also LONG CAP NUT).

STUD - A threaded bolt extending from the hub surface to which the wheels are secured by the cap nuts.

STUD LOCATED, BALL SEAT MOUNTING - A wheel mounting system which uses the studs and spherical ball seat cap nuts to center and secure the wheel (not applicable for EU type Alcoa wheels).

TYRE BEAD - That surface of the tyre which contacts the angled surface of the wheel rim.

TORQUE - The amount of force used to tighten cap nuts. Usually stated in Foot-pounds or Newton-meters and measured with a torque wrench.

WHEEL MOUNTING FACE - Mounting area, support surface diameter, that portion of the wheel face which contacts the hub or brake drum.

8.b. Conversion Factors

Inches to Millimeters
Inches x 25,4 = Millimeters

Millimeters to Inches
Millimeters x 0.03937 = Inches

PSI to kPa
PSI x 6,8948 = kPa

kPa to PSI
kPa x 0.145 = PSI

Pounds to Kilograms
Pounds x 0,4536 = kg

Kilograms to Pounds
kg x 2.2046 = Pounds

Foot-pounds to Newton - meters
Ft-lbs x 1,35582 = Nm

Newton Meters to Foot-pounds
Nm x 0.737562 = Ft-lbs

9 Contact

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Englisch - April 2010